

UNIVERSIDAD COMPLUTENSE DE MADRID

FACULTAD DE PSICOLOGIA
Departamento de Psicología Social



INTEGRATING LEADERSHIP BEHAVIOR AND CLIMATE PERCEPTIONS IN TEAMWORK: ANTECEDENTS, STRUCTURE, AND INFLUENCE ON WORK GROUPS IN INNOVATION, SATISFACTION, AND EFFECTIVENESS IN ORGANIZATIONS.

MEMORIA PARA OPTAR AL GRADO DE DOCTOR

PRESENTADA POR

D. Ángel Barrasa Notario

Bajo la dirección del doctor:

D. Francisco Gil, Carlos M. Alcocer y Ramón Rico

Madrid, 2010

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ANGEL BARRASA

2006

COMPLUTENSE UNIVERSITY OF MADRID
Faculty of Psychology
Department of Social Psychology



DOCTORAL THESIS

***Integrating Leadership Behavior and Climate Perceptions in
Teamwork:
Antecedents, Structure, and Influence on Work Groups’
Innovation, Satisfaction, and Effectiveness in Organizations***

ANGEL BARRASA

September 2006

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*A la memoria de Pilar Benito Páez,
porque hubiera entendido este trabajo mejor que nadie*

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Angel Barrasa

Birmingham, April 2006

SUMMARY

Organizations in nowadays with a changing environment need leaders who are able to analyze the situation, determine what pattern of leadership behavior is needed to influence processes that are relevant for work groups effectiveness. Literature on the topic of leadership rests on a two-dimensional model (the task-oriented and relation-oriented behaviors), and recently on new paradigms (transformational and charismatic leadership). The transformations currently affecting organizations require the design of team-based structures, a task for leaders seeking effective change management. The tri-dimensional model proposed by Yukl (2004) incorporates change among the conventional categories, making it compatible with the received literature, despite significant differences. The objective of this study is to analyze the impact of change-oriented leaders on team outcomes.

Other aim of this study is to analyze the antecedents and structure of the hierarchical taxonomy of leadership behavior proposed, and its impact on team effectiveness. Confirmatory factor analysis and hierarchical regression analysis were carried out to test these hypotheses. Our results confirm these relationships in general.

This study tested the predictions of the team climate for innovation model in explaining satisfaction and performance at group level. Organizational context specific data ($N= 239$ teams, 1099 individuals, from hospitals, public administration, and software company) were analyzed via multigroup structural equation modelling.

To achieve this, we propose an explanatory model in which the team climate (in particular as it relates to innovation) represents the nexus mediating between change-oriented leadership and group outcomes, while group potency reinforces the relationship. The results confirm these relationships in general.

Results provided evidence supporting the proposed model, comparisons showed that the obtained associations were similar for the three different types of teamwork with invariance of factor loadings and factor variances. There were many organizational context differences in the model, mainly concerning error variances in latent variables, team climate means, and explained variance for team satisfaction and performance in different teams.

The study discusses theoretical implications of this study, sets out some practical applications, and remarks some trends for future research.

RESUMEN

Introducción, Objetivos, Conclusiones, Aportaciones fundamentales de la tesis

Este estudio se fundamenta a partir de un modelo del funcionamiento de los equipos de trabajo en las organizaciones: el primer eje del modelo lo constituyen los inputs o entradas, los antecedentes de los grupos, la primera que se considera es influencia que ejercen los líderes de los equipos, liderazgo de tarea y de relación, a los que se suma el nuevo constructo de liderazgo de cambio (Yukl, 2005), los tres constituyen el primer nivel de influencia sobre los procesos grupales del equipo; la segunda entrada son las características elementales propias de los equipos de trabajo, se consideran tanto el tamaño de los grupos como la antigüedad de los miembros de los equipos. El segundo eje lo constituyen los propios procesos grupales, el primero de ellos y que más profundamente se ha analizado en este estudio es el de clima de equipo, y específicamente un modelo clima de equipo para la innovación (West, 1990), compuesto por elementos de participación, apoyo a la innovación, claridad de objetivos o visión, y orientación a la tarea de los miembros del equipo de trabajo. El otro proceso grupal estudiado es la potencia grupal (Guzzo, Yost, Campbell y Shea, 1993), constructo que se rige por elementos de autoeficacia a nivel grupal. Para establecer los mecanismos subyacentes a los elementos de estos dos primeros ejes se analiza la estructura jerárquica de liderazgo compuesta por los tres tipos de orientaciones para dirigir, así como la estructura de cuatro factores de clima de equipo para la innovación, que conllevan una línea de dirección excelente en todos los ámbitos y unos equipos de trabajo innovadores altamente eficientes respectivamente.

Para comprobar la utilidad del modelo propuesto se han utilizado diferentes medidas de output o salidas, resultados de los equipos de trabajo. Medidas externas al equipo (objetivas y subjetivas) sobre el rendimiento real de los grupos, así como una medida específica de rendimiento para la innovación. Asimismo se han considerado resultados relativos a la satisfacción de los miembros del equipo, estimadas tanto desde el nivel de análisis individual como grupal.

Se han usado muestras de equipos de trabajo de hospitales, de una compañía de software y de la administración pública ($N=89$, $N=239$ y $N=20$, respectivamente a nivel de equipo; $N=409$, $N=484$, $N=209$ a nivel individual), así como los instrumentos originales adaptados de liderazgo (*MLQ*, Yukl, 2002) o de clima de equipo (*TCI*, Anderson y West, 1994). Los análisis llevados a cabo van desde los factoriales confirmatorios para testar la estructura de liderazgo y de clima, regresiones para analizar el efecto sobre el rendimiento de los equipos, funciones curvilíneas para la influencia del tamaño del equipo, o mediaciones y moderaciones de clima y de potencia grupal respectivamente sobre el liderazgo, hasta modelos de ecuaciones estructurales multigroup para analizar diferencias de los diferentes tipos de trabajo en equipo debido a diferencias contextuales de organizaciones.

Finalmente, las aportaciones fundamentales de la tesis van en la línea de confirmar ampliamente el modelo propuesto tanto para diferentes contextos organizacionales como para diferentes culturas, con estabilidad de las estructuras de liderazgo y de clima de equipo, influencia de la dirección, especialmente del liderazgo de cambio, de manera directa, sobre los procesos grupales y estos a su vez sobre los resultados de los equipos, las influencias no lineales del tamaño, los efectos de mediación del clima de equipo y de moderación de la potencia grupal, todo ello con importantes implicaciones para el funcionamiento de los equipos de trabajo a nivel de rendimiento, innovación y satisfacción.

INTRODUCCIÓN

Liderazgo, clima de equipo y potencia grupal: análisis de su influencia en eficacia y satisfacción de diferentes equipos de trabajo

(Revisión del estado actual del tema, objetivos, discusión integradora, conclusiones)

Resumen

En el contexto de la Psicología de las Organizaciones y del Trabajo y en una línea de investigación que analiza la dirección y el desarrollo de los equipos y los grupos de trabajo en las organizaciones, se está llevando a cabo un proyecto de investigación basado en un modelo de influencia del trabajo en equipo con consecuencias en la eficacia y satisfacción a distintos niveles.

Se ha comprobado una influencia diferencial de distintas orientaciones del liderazgo de los equipos de trabajo: liderazgo orientado a la tarea, orientado a la relación y orientado al cambio, realizando especial énfasis en éste último, por su capacidad de predicción y por su novedad. Mediando el proceso de influencia del liderazgo en los equipos surge el constructo de clima de equipo, y específicamente el clima de innovación; y moderándolo, a su vez, la potencia grupal, de forma que la influencia es mínima en unos equipos y máxima en otros en función de su nivel de potencia grupal. Asimismo se planifica analizar el trabajo en equipo en función de diferentes variables resultado como eficacia o satisfacción; en función de

diferentes niveles homólogos de análisis: individual, grupal y organizacional; y en diferentes contextos organizacionales como el sanitario, informático o consultoría.

La perspectiva de los jóvenes investigadores puede ayudar a desentrañar algunas incógnitas sobre conceptos nuevos y nuevas formas de organización del trabajo.

Revisión del estado actual del tema

Dentro del marco de la Psicología de las Organizaciones y del Trabajo y en una línea de investigación que analiza la dirección y el desarrollo de los equipos y los grupos de trabajo en las organizaciones, se está llevando a cabo un proyecto de investigación basado en un modelo de influencia del trabajo en equipo sobre la eficacia y satisfacción a distintos niveles (individuales, grupales y organizacionales).

Las transformaciones que actualmente afectan a las organizaciones pasan por el diseño de estructuras basadas en equipos, y los equipos son hoy en día las unidades básicas de funcionamiento de las organizaciones. Ello es debido a que los equipos permiten la acumulación de diferentes habilidades y del conocimiento necesario, la experiencia y competencias para responder de forma rápida y flexible a las demandas de las organizaciones actuales. En cualquier caso, el buen funcionamiento de los equipos de trabajo y su efectividad en el contexto organizacional va a depender de su apropiado diseño previo, por lo que resulta relevante el análisis del conjunto de variables influyentes en él (Guzzo y Dickson, 1996).

En este contexto de trabajo en equipo se analiza el papel desarrollado por el líder de estos equipos, el clima de equipo que se crea durante el trabajo conjunto, y otras variables como la potencia grupal, que pueden ejercer influencia en las variables resultado, tanto la satisfacción como el rendimiento de estos equipos de trabajo.

El eje fundamental de esta investigación viene marcado por la influencia del liderazgo en los equipos de trabajo. El liderazgo ha sido identificado como una variable crucial para el funcionamiento de los equipos y como una de las principales razones del éxito o fracaso de la implantación de sistemas de trabajo basados en equipos.

Tradicionalmente las teorías de liderazgo enfatizaban una concepción bidimensional: un conjunto de conductas que debía llevar a cabo el líder centradas en la tarea y otro conjunto centradas en la relación.

Sin embargo, esta visión bidimensional ha mostrado serias carencias a la hora de predecir la eficacia del liderazgo en distintos contextos organizacionales (Yukl, 2002).

Ni siquiera las más recientes propuestas del liderazgo carismático o transformacional presentan una relación consistente entre influencia del líder y resultados de equipo (Bass, Avolio, Jung y Berson, 2003).

De este modo, y a partir de los resultados obtenidos previamente Yukl, Gordon y Taber (2002) elaboran un modelo explicativo de tres factores en el que se establece una clara distinción entre los tres componentes: la categoría Tarea comprende las conductas de alta eficiencia en el uso de recursos y personal, seguridad en el trabajo con operaciones, productos y servicios; la categoría Relación comprende un fuerte compromiso con la organización y su misión, alto nivel de confianza mutua y cooperación entre los miembros; finalmente, la nueva categoría Cambio comprende las grandes mejoras de innovación (en procesos, productos o servicios) y alta adaptación a cambios externos.

Objetivos

Este modelo de las conductas de liderazgo propuesto por Yukl (Yukl, 2002; Yukl y Lepsinger, 2004) da lugar a distintas versiones de un cuestionario basado en los tres factores

previstos con confirmación empírica en distintas muestras y contextos (Barrasa, 2004; Gil, Ares y Barrasa, 2003; Yukl, Gordon y Taber, 2002; Yukl, Seifert y Chavez, 2005).

Tabla 1

Correlaciones a nivel de equipo de las variables de liderazgo (Barrasa, 2004)

Variable	1	2	3	4	5	6	7
1. Liderazgo de Tarea	-						
2. Liderazgo de Relación	0,60**	-					
3. Liderazgo de Cambio	0,63**	0,86**	-				
4. Eficacia Grupal	0,46**	0,54**	0,66**	-			
5. Satisfacción	0,51**	0,84**	0,85**	0,82**	-		
6. Tamaño de Equipo	0,15	0,03	0,10	0,02	0,21	-	
7. Tiempo de pertenencia	0,07	0,09	0,05	0,00	0,16	0,08	-

Nota: p<0.05, ** p<0.01

Discusión integradora

Otro punto crucial de nuestra investigación es el clima de equipo; definido como las percepciones compartidas respecto al trabajo grupal más cercano (Anderson y West, 1994).

Algunos estudios previos han analizado la relación entre las dimensiones de liderazgo y el clima de trabajo (Kozlowski y Doherty, 1989; Gil, Rico, Alcover y Barrasa, 2005; West y

Hirst, 2003) mostrándo una clara vinculación y un efecto conjunto en las variables resultado de rendimiento.

El clima de equipo es evaluado a partir del ‘Team Climate Inventory’ toma en consideración cuatro componentes fundamentales del clima: Visión, una idea de un resultado valorado que representa una meta y una fuerza motivante en el trabajo; Participación, implicación en la toma de decisiones; Orientación a la tarea, excelencia en la labor a realizar; Apoyo a la innovación, introducción de nuevas ideas y mejoras en el modo de llevar a cabo el trabajo (Anderson y West, 1994).

Conclusiones

Finalmente, existe otro conjunto de variables relacionadas que pueden resultar relevantes para aclarar puntos concretos del modelo; quizás la más importante de todas ellas sea potencia grupal.

Potencia grupal ha sido definido como la creencia colectiva existente en un grupo acerca de que éste puede ser efectivo (Alcover y Gil, 2000). Este constructo se da a nivel grupal y se muestra claramente relacionado con el grado de rendimiento final de los equipos. Asimismo se ha comprobado en estudios previos que la influencia del liderazgo sobre variables resultado como rendimiento o satisfacción es mínima en unos equipos y máxima en otros en función de su nivel de potencia grupal (Gil, Rico, Alcover y Barrasa, 2005).

Asimismo se planifica analizar el trabajo en equipo en función de diferentes variables resultado como eficacia o satisfacción; en función de diferentes niveles homólogos de análisis: individual, grupal y organizacional; y en diferentes contextos organizacionales como el sanitario, informático o consultoría.

La perspectiva de los jóvenes investigadores puede ayudar a desentrañar algunas incógnitas sobre conceptos nuevos y nuevas formas de organización del trabajo que no habían sido suficientemente estudiadas.

Referencias

- Alcover, C. M. y Gil, F. (2000). Potencia en grupos: un constructo entre la autoeficacia y la motivación colectiva. *Apuntes de Psicología*, 18, 123-143.
- Ancona, D. y Caldwell, D. F. (1992). Bridging the boundary: external activity and performance in organizacional teams. *Administrative Science Quarterly*, 37, 634-665.
- Anderson, N. R. y West, M. A. (1994). *The Team Climate Inventory*. Windsor, Berks: ASE Press.
- Barrasa, A. (2004). Hierarchical Taxonomy of Leadership Behavior: Antecedents, Structure, and Influence in Work Groups Effectiveness. Trabajo de investigación sin publicar.
- Bass, B. M., Avolio, B. J., Jung, D. I. y Berson, Y. (2003). Predicting unit performance by assessing transformational and transactional leadership. *Journal of Applied Psychology*, 88, 207-218.
- Gil, F., Ares, A. y Barrasa, A. (2003). Dirección y liderazgo organizacional: gestión y cambio. *Encuentros en Psicología Social*, 1, 95-100.
- Gil, F., Rico, R., Alcover, C. M. y Barrasa, A. (2005). Change-oriented leadership, satisfaction and performance in work groups: effects of team climate and group potency. *Journal of Managerial Psychology*, 20, 312-328.
- Guzzo, R. A. y Dickson, M. W. (1996). Teams in organizations: Recent research on performance and effectiveness. *Annual Review of Psychology*, 47, 307-338.
- Kozlowski, S. W. y Doherty, M. L. (1989). Integration of climate and leadership: examination of a neglected issue. *Journal of Applied Psychology*, 74, 546-553.
- West, M. A. y Hirst, G. (2003). Cooperation and teamwork for innovation. En M. A. West, D. Tjosvold y K. G. Smith (Eds.), *International Handbook of Organizational Teamwork and Cooperative Working* (pp. 297-319). Chichester: Wiley.

- Yukl, G. (2004). Tridimensional leadership theory: a road-map for flexible, adaptive leaders. En Burke, R. J. y C. Cooper (Eds.), *Leading in Turbulent Times* (pp. 75-91). Oxford: Blackwell.
- Yukl, G. (2002). *Leadership in organizations*. Upper Saddle River: Prentice-Hall.
- Yukl, G. y Lepsinger, R. (2004). *Flexible Leadership. Creating Value by Balancing Multiple Challenges and Choices*. San Francisco: Joseey-Bass.
- Yukl, G., Gordon, A. y Taber, T. (2002). A hierarchical taxonomy of leadership behavior: integrating a half century of behavior research. *Journal of Leadership and Organizational Studies*, 9, 15-32.
- Yukl, G., Seifert, C. F. y Chavez, C. (2005). Validation of the Extended Version of the Influence Behavior Questionnaire. Academy of Management Annual Meeting. Honolulu, Hawaii.

ARTICLE 1

Hierarchical Taxonomy of Leadership Behavior: Antecedents, Structure, and Influence in Work Groups Effectiveness

Abstract

Organizations in nowadays with a changing environment need leaders who are able to analyze the situation, determine what pattern of leadership behavior is needed to influence processes that are relevant for work groups effectiveness. Literature on the topic of leadership rests on a two-dimensional model (the task-oriented and relation-oriented behaviors), and recently on new paradigms (transformational and charismatic leadership). The three-dimensional model proposed by Yukl (2003) incorporates change among the conventional categories, making it compatible with the received literature, despite significant differences. The aim of this paper is to analyze the antecedents and structure of the hierarchical taxonomy of leadership behavior proposed, and its impact on team effectiveness. Confirmatory factor analysis and hierarchical regression analysis were carried out to test these hypotheses. Our results confirm these relationships in general. The paper discusses theoretical implications of this study, sets out some practical applications, and remarks some trends for future research.

Resumen

Las organizaciones en la actualidad con un ambiente cambiante necesitan líderes capaces de analizar la situación, determinar que modelo de conductas de liderazgo son necesarias para influir en los procesos relevantes para la efectividad de los grupos de trabajo. La literatura sobre liderazgo se ha apoyado en los modelos bidimensional (líder centrado en las tareas y en la relación), y más recientemente en nuevos paradigmas (liderazgo transformacional y

carismático). Compatible con estos últimos, aunque estableciendo importantes diferencias con ellos, el modelo tridimensional propuesto por Yukl (2003) incorpora a las categorías tradicionales la de cambio. El objetivo de esta investigación es analizar los antecedentes y la estructura de la taxonomía jerárquica de liderazgo propuesta, y su impacto sobre la eficacia de los equipos. Se llevaron a cabo análisis factoriales confirmatorios y análisis de regresión para probar estas hipótesis. Los resultados confirman en general estas relaciones. Se discuten las implicaciones teóricas de este estudio y se extraen aplicaciones prácticas, indicando finalmente líneas futuras de investigación.

Organizations in nowadays with a changing environment need leaders who are able to analyze the situation, determine what pattern of leadership behavior is needed to influence processes that are relevant for work groups effectiveness. A major problem in research and theory on effective leadership has been the lack of agreement about which behavior categories are relevant and meaningful for leaders (Yukl, Gordon, & Taber, 2002).

By the 1990s, issues of transformational leadership and charisma had become the dominant themes in leadership studies, and there was a proliferation of models and perspectives on charismatic and transformational leadership (Munduate & Medina, 2004). The charismatic leadership theory developed by Conger and Kanungo (1988) relies on its effect on followers and society in general and stemmed from their radical vision of a new world, the exhibition of their own behavior for followers to imitate, and the confidence expressed in the followers' capacity to achieve challenging goals.

In other way, behavioral models of leadership analyze what leaders or managers do with whatever personal traits, skills, or motivational capacities. The primary concern of behavioral models focused on developing methods to determine what leaders do and measure relevant

dimensions of their behavior that might be linked to group effectiveness and subordinate satisfaction (Yukl, 2002).

Two Factors Model: Task and Relations Behavior

The early leadership research emphasized two general, broadly-defined behavior categories ('metacategories') that are best described as relations-oriented behavior and task-oriented behavior.

For three decades, research on leader behavior was dominated by a focus on these two broadly-defined categories of behavior.

Two main dimensions that reflected how subordinates perceived a manager's behavior were identified. Consideration (or relationship-oriented) behaviors reflect the extent to which a leader shows concern for subordinates' satisfaction and wellbeing. Initiating structure (or task-oriented) behaviors reflect the degree to which a leader explains and defines the roles of a task, assigns subordinates to various task roles, controls subordinates' performance, and provides feedback to subordinates.

Because these are two independent dimensions, the behavior of a leader may be described as a combination of both. According to this perspective, the ideal leader would be someone with high scores on both dimensions (Avolio, Sosik, Jung, & Berson, 2003; Bass, 1990; Clark & Clark, 1990; Munduate & Medina, 2004; Yukl, 2002).

Many studies were conducted to see how measures of consideration and initiating structure were correlated with criteria of leadership effectiveness, such as subordinate satisfaction and performance. A meta-analysis of this survey research found that both behaviors have a positive but weak correlation with subordinate performance (Fisher & Edwards, 1988).

Subsequent research on specific types of task and relations behavior found correlations with unit performance that were sometimes stronger but still not consistent across situations (Yukl, 2002).

The literature on leadership is based on the classical bi-factorial models, although more recently has been developed ‘new paradigms’, as charismatic and transformational leadership, among others. The links between different forms of leadership and team outcomes as proposed in these models are not, however, wholly consistent (Bass et al., 2003), which suggests there is a need for further research.

Change-Oriented Leadership

Recently researchers have become interested in the way leaders initiate and implement change in organizations. The importance of change management is the modern organization’s response to an

ineluctable need. Faced with ongoing processes of transformation, firms and institutions of all kinds have been obliged to assign the job of anticipating change and providing guidance to their managers, executives and leaders (Kotter, 1990). The transformational and charismatic leadership theories (Bass, 1985; Conger and Kanungo, 1988; House, 1977) refer to certain kinds of change-oriented behavior, and there is considerable evidence that such patterns are related to effective leadership, as shown in the meta-analysis carried out by Lowe, Kroeck and Sivasubramaniam (1996).

Theories of transformational and charismatic leadership (Bass, 1985; Conger & Kanungo, 1998; House, 1977; Shamir, House, & Arthur, 1993) include some change-oriented behaviors, and there is growing evidence that these behaviors are related to effectiveness of leaders (Lowe, Kroeck, & Sivasubramaniam, 1996; Yukl, Gordon, & Taber (2002).

The tri-dimensional model is compatible with the transformational and charismatic leadership theories, although its aim is in fact to explain leadership processes at a different conceptual level of

analysis. This model seeks to describe the influence of leaders on *organizational processes* (rather than on the motivation and perceptions of subordinates), analyze *contingent* (as opposed to universal) aspects of effective leadership, and highlight the importance of leadership *processes* (instead of focusing on a leader figure). It also represents an effort to identify the behavior patterns that make up each category in such away that each type of behavior is observable, is potentially applicable to leaders of all kinds in organizations, is fundamentally relevant to the category in question, and is based on prior theory and research.

Change management is raised in a variety of organizational theories (Tushman & Romanelli, 1985) and is supported by a body of existing research (Ekvall & Arvonen, 1991; Gil, Ares & Barrasa, 2003; Yukl, 1998; Yukl, Gordon & Taber, 2002) which has resulted in its identification as a key category for effective leadership. This category comprises the following behavior sets: monitoring the environment, encouraging innovative thinking, explaining need for change, envisioning change, and taking personal risks.

Three Factor Model: Task, Relations, and Change Behavior

The first evidence that change-oriented leadership is a distinct type of behavior comes from several studies conducted recently. In the first study, Ekvall and Arvonen (1991) developed a behavior description questionnaire with items from earlier questionnaires such as the LBDQ and some new items on aspects of change-oriented leadership. There was strong support for a three-factor solution in each national sample, and the factors were labelled production centred, employee centred, and change centred. The latter factor included promoting change and growth, providing creative solutions, encouraging creative thinking by others,

experimenting with new ways of doing things, making risky decisions when necessary, and planning for the future. Change-oriented behavior correlated the strongest with subordinate ratings of the manager's competence, whereas employee-centred behavior correlated highest with subordinate satisfaction with the manager.

In a second study, Yukl (1998) administered leader behavior questionnaires included representative items from the Managerial Practices Survey (MPS). An exploratory factor analysis produced a clear factor structure for task-oriented behavior, relationship-oriented behavior, and change-oriented behavior.

The latter factor included identifying external threats and opportunities, envisioning new possibilities, proposing innovative strategies, and encouraging innovative thinking by followers. The scale scores for task, relations, and change behavior were all correlated significantly with subordinate satisfaction with the leader and organizational commitment.

Gil & Barrasa (2002) carried out a research about manager competences from bifactorial leadership model using an on-line questionnaire with 120 top managers as sample. Authors found that model of two factors was not absolutely right, and bifactorial structure improved adding a new category related with change-oriented behaviors.

Finally, Gil, Rico, Alcover, & Barrasa (2005) proposed an explanatory model in which the team climate (specifically team climate of innovation) represents the nexus mediating between change-oriented leadership and group outcomes (satisfaction and performance), while group potency reinforces the relationship. Results confirm these relationships in general.

These studies made a good start at identifying a distinct category of change-oriented leadership and showing that it is relevant for leadership effectiveness.

The specific behaviors provide a much better basis than behavior constructs that are very broad and abstract for developing contingency theories of leadership effectiveness (Yukl, 2002).

A hierarchical taxonomy provides a way to reconcile the three-factor solution with the many specific behaviors already found relevant for effective leadership in several types of research.

The Hierarchical Taxonomy of Leadership Behavior

The *three-dimensional leadership* model, recently developed by Yukl (Yukl, 2003; Yukl, Gordon & Taber, 2002) identifies three major categories, adding *change* to the classical bi-factorial models

(*task* and *relation*-oriented leadership). By proposing the incorporation of the category of change, the tri-dimensional model allows the integration of the two major traditions of *management* and *leadership* theory, which have normally stood apart, each having its own literature. Rather than seeking to establish distinctions between managers and leaders, the two can be explained jointly using the same processes and models (Yukl, 2002). The view that people employ a mix of leadership and management behaviors appears much closer to reality, and it is therefore necessary for those that are responsible of teams to learn to combine the necessary skills to direct day-to-day affairs effectively (a task traditionally associated with management) while at the same time anticipating and managing change (leadership) (Gil, 2003).

The theoretical basis for the distinction among the three metacategories is the primary objective of the behavior. The primary objectives of task behavior include high efficiency in the use of resources and personnel, and high reliability of operations, products, and services. The primary objectives of relations behavior include strong commitment to the unit and its mission, and a high level of mutual trust and cooperation among members. The primary

objectives of change behavior include major innovative improvements (in processes, products, or services), and adaptation to external changes (Yukl, Gordon, & Taber, 2002). Several criteria were used in selecting the specific behavior components to include in the proposed hierarchical taxonomy. First, each behavior must be directly observable. It cannot be defined only in terms of attributions or outcomes. Second, each behavior must be potentially applicable to all types of leaders in organizations. Third, each behavior must have primary relevance for one metacategory, even though it could have secondary relevance for the other metacategories. Fourth, each behavior must be grounded in prior theory and research on effective leadership.

Table 1

<i>Definition of the Specific Leadership Behaviors (Yukl, Gordon, & Taber, 2002).</i>	
Task Behaviors	
Clarifying Roles:	assigning tasks and explaining job responsibilities, task objectives, and performance expectations.
Monitoring Operations:	checking on the progress and quality of the work, and evaluating individual and unit performance.
Short-Term Planning:	determining how to use personnel and resources to accomplish a task efficiently, and determining how to schedule and coordinate unit activities efficiently.
Relations Behaviors	
Consulting:	acting considerate, showing sympathy and support when someone is upset or anxious, and providing encouragement and support when there is a difficult, stressful task.
Recognizing:	providing praise and recognition for effective performance, significant achievements, special contributions, and performance improvements.

Developing: providing coaching and advice, providing opportunities for skill development, and helping people learn how to improve their skills.

Empowering: allowing substantial responsibility and discretion in work activities, and trusting people to solve problems and make decisions without getting prior approval.

Change Behaviors

Envisioning Change: presenting an appealing description of desirable outcomes that can be achieved by the unit, describing a proposed change with great enthusiasm and conviction.

Taking Risks for Change: taking personal risks and making sacrifices to encourage and promote desirable change in the organization.

Encouraging Innovative Thinking: challenging people to question their assumptions about the work and consider better ways to do it.

External Monitoring: analyzing information about events, trends, and changes in the external environment to identify threats and opportunities for the organizational unit.

Hypothesis 1. Hierarchical Taxonomy of Leadership Behavior will show a three-factorial structure into an integrative model of leadership.

The taxonomy identifies behaviors that are potentially relevant for effective leadership, but it is not assumed that they are equally relevant in all situations, or that every behavior is relevant in every

situation. In future research, it will be desirable to relate the leadership behaviors to criteria of leadership effectiveness. Because many of the behaviors emphasize leader influence on collective processes rather than on dyadic processes, it is especially desirable to conduct studies that include objective measures of unit performance. The studies should also measure

aspects of the situation that determine the relative importance of the different behaviors. In this way, we can make progress in developing contingency theories of flexible, adaptive leadership.

The metacategories are useful for organizing specific behaviors with a similar objective, but they should not be used as a substitute for the specific behaviors. The utility of the metacategories will depend on the extent to which they are able to improve the prediction of leadership effectiveness or the explanation of why some leaders are more effective than others in a given situation.

Hypothesis 2. Metacategories of the hierarchical taxonomy of leadership behavior (task, relations, and change oriented behaviors) reinforces and will explain team effectiveness.

Method

Sample

The sample comprises 328 participants, who are members of 78 healthcare teams at different public

hospitals throughout Spain (Madrid, Barcelona, Málaga, La Coruña, Sevilla and Cadiz).

Eleven teams were discarded because we did not receive an appropriate number of responses from members (teams with a response rate of below 30% of total members) or because they lacked at least two external measures of effectiveness. Work unit was defined as the set of members working in the same structural unit and also working in the same shift, in those units where there were several workshifts.. Finally, group size ranged from 3 to 19 employees, and the average of members per work group was 7.74 ($SD= 4,38$).

Measures

Hierarchical Taxonomy of Leadership Behavior. Behavior associated with leadership is evaluated using a recent questionnaire designed by Yukl on the basis of earlier inventories (Yukl, Gordon and Taber, 2002). The questionnaire comprises three scales: task, relation and change-oriented leadership. Earlier studies have demonstrated that the psychometric characteristics of the questionnaire are appropriate (Yukl, Gordon & Taber, 2002; Gil, Ares & Barrasa, 2003) See Table 2. The items had a five-choice response format with anchors for each choice. The anchors emphasized magnitude rather than frequency (1-Not at all or not applicable, 5-To a great extent). The order of scale items was randomized within the constraint that all behavior must appear in the first part of questionnaire and no behavior could be concentrated in only one part of the questionnaire.

The internal consistency reliability for each scale was determined with the Cronbach alpha statistic, and the values for all scales exceeded the recommended lower bound for an acceptable estimate of internal consistency ($\alpha > .70$). Most of the values were greater than .70.

Team performance. Team performance was assessed via external supervisors and managers with appropriate knowledge, each team being scored as a unit. The scale from Ancona & Caldwell (1992) was applied. This comprises 5 items (team's efficiency, quality of technical innovations, adherence to schedules, adherence to budgets and ability to resolve conflicts), with $\alpha = 0.83$. Each dimension was scored by managers using a 5-point Likert scale (1 = disagree completely, 5 = completely agree). Between two and three evaluations were obtained from various supervisors and managers with a good knowledge of the team (in the absence of at least two such evaluations teams were discarded), resulting in an inter-judge coefficient of 0.74.

Finally, the control measures employed were *team size* (a score was assigned to the number of team members based on data provided by the pertinent department) with an average of 10.6 (SD = 5.33), and *team tenure* (a score was assigned to the time each member had formed part of the team based on individual responses, as a result of which we obtained an aggregate measure for each team at the group level with $ICC = 0.59$) with an average of 9.6 (SD = 5.49).

Procedure

We contacted the Human Resources departments at each organization to apply for their assistance. We also held meetings with the HR managers and the supervisors, officers and managers responsible for the various work units concerned to explain the objectives of the project and the procedure we intended to follow. Team members were invited to participate voluntarily by completing an individual and anonymous questionnaire. External supervisors and managers were also asked to complete a specific questionnaire, again individually and anonymously, to score group effectiveness.

Table 2

<i>Means, Standard Deviations, and Intraclass Correlation Coefficients.</i>			
Variable	M	SD	ICC
Task oriented leadership	3,00	0,86	0,60
Relations oriented leadership	4,18	0,83	0,59
Change oriented leadership	3,34	0,60	0,55
Team performance	3,22	0,72	0,53

Results

Correlation coefficients for all of the variables are presented in Table 3. Firstly, the team size and tenure variables are not correlated with any of the variables forming part of the model tested.

Table 3

Correlation coefficients for leadership variables, team performance, and control variables

Variable	1	2	3	4	5	6
1. Task oriented leadership						
2. Relations oriented leadership	0.60**					
3. Change oriented leadership	0.63**	0.86**				
4. Team performance	0.53**	0.43**	0.63**			
5. Team size	0.15	0.03	0.10	0.02		
6. Team tenure	0.07	0.09	0.05	0.00	0.16	

Note: * $p < 0.05$, ** $p < 0.01$

In order to test the hypotheses 1, confirmatory factor analysis was performed to verify the structure of the hierarchical taxonomy of leadership behavior. The intercorrelations among the 15 behavior scales were analyzed using confirmatory factor analysis with maximum likelihood estimation to test the fit of the theoretical model (See Figure 1).

Multiple criteria were used to test the fit of the model to the matrix of intercorrelations (Table 4). The Chi-squared statistic was computed to test the overall goodness of fit between the observed correlation matrix and the matrix reproduced from the factor model. A large value of this statistic indicates a poor fit of the model to the data, because it indicates a significant difference between the observed correlation matrix and the correlations estimated by the theoretical model. Unfortunately, this statistic is affected by sample size as well as model fit.

A large sample often yields a significant value even when the model fits the data very well. For that reason, is necessary evaluating Chi-squared relative to its degrees of freedom. A ratio of less than 2.0 indicates a reasonable model fit.

The GFI (Goodness of Fit Index) is not affected by sample size. It is an index of how well the theoretical model reproduces the observed correlations. GFI values range from zero to 1.0, and it has been proposed that an acceptable fit requires a value of at least .90, with .95 representing a very good fit. The RMSEA is an estimate of the mean difference between each observed and reproduced correlation. It has been proposed that an acceptable fit requires a value of .08 or less, with .05 representing a very good fit.

Table 4

Goodness of fit Tests and fit Indices for the Tested Model

	χ^2	df	p	GFI	RMSEA
Model	193.14	102	0.093	0.97	0.072

Note: χ^2 = Chi-square goodness-of-fit index; GFI = Goodness of Fit Index; RMSEA= Root Mean Square Error of Approximation.

In order to test the hypotheses 2, hierarchical regression analysis was performed at team level to verify the influence of leadership behaviors on team effectiveness (Table 5).

To aggregate individual-level data to group level, first a theoretical rationale has to support it, but, in addition, it must be assessed empirically, by means of demonstration of agreement within groups and differences between groups. The agreement within group can be calculated by interclass correlation (ICC), Interrater agreement (rwg) and average deviation index (AD). The average deviation index (AD) has several advantages compared to other indexes, since it does not need explicitly modeling the random or null response distribution. Average deviation

index is computed taking the average of the items average deviation (AD). Null response range or range of acceptable interrater agreement for six point scales is 1. Therefore, all AD index for items and AD index for scale are less or equal than 1, indicate acceptable interrater agreement. Average deviation index (AD) was calculated for all groups on each of individual variables (task, relations, and change behaviors).

On the other hand when aggregate variables are used, it is recommended to calculate ANOVAs. This procedure demonstrates that there are differences among groups or between group variance in our variables. And therefore, our variables can be studied at group level.

Table 5

Hierarchical Regression Analysis of leadership behaviors on team performance (N = 78 teams)

Step	Independent Variable	β^2	R^2	ΔR^2
1	Team size	0.02	0.08	0.08
	Team tenure	-0.01		
2	Task oriented leadership	0.25**	0.75	0.67**
	Relation oriented leadership	0.11**		
	Change oriented leadership	0.31**		

Note: * p<.05, ** p<.01

Discussion

The results obtained from this research provide in a broad sense empirical support for hypotheses 1 regarding factorial structure and for hypothesis 2 regarding effectiveness. We found the specific behaviors measured by the questionnaire can be grouped into the three proposed metacategories in terms of their primary objective.

This hierarchical taxonomy offers a number of advantages. It provides a parsimonious and meaningful conceptual framework that shows how the behaviors are interrelated. It combines the parsimony of a few, broadly defined metacategories with the greater explanatory power of specific component behaviors that can be related to the requirements for a particular situation. It helps to integrate findings from prior research, and it can be used to derive more comprehensive theories of effective leadership.

To conclude, the need of the leader's skill to analyze the situation, to anticipate change and providing the team with guidance we can consider as a key variable, relevant to include it into the behavioral leadership models.

References

- Ancona, D. & Caldwell, D. F. (1992). Demography and design: predictors of new product team performance. *Organization Science*, 3, 321-341.
- Avolio, B. J., Sosik, J. J., Jung, D. I., & Berson, Y. (2003). Leadership Models, Methods, and Applications. In W. C. Borman, D. R. Ilgen, & R. J. Klimoski (Eds.), *Industrial and Organizational Psychology* (pp. 277-307). Hoboken: John Wiley & Sons.
- Bass, B. M. (1985). *Leadership and Performance beyond expectations*. New York: Free Press.
- Bass, B. M. (1990). *Bass & Stogdill's Handbook of Leadership. Theory, Research, and Managerial Applications*. London: Free Press.
- Bass, B. M., Avolio, B. J., Jung, D. I. y Berson, Y. (2003). Predicting unit performance by assessing transformational and transactional leadership. *Journal of Applied Psychology*, 88, 207-218.
- Clark, K. E. & Clarke, M. B. (1990). *Measures of Leadership*. Greensboro, NC: CCL.
- Conger, J. A. & Kanungo, R. (1998). *Charismatic Leadership in Organizations*. Thousand Oaks, CA: Sage.
- Ervall, G. & Arvonen, J. (1991). Change-centred leadership: An extension of the twodimensional model. *Scandinavian Journal of Management*, 7, 17-26.
- Fisher, B. M. & Edwards, J. E. (1988). Consideration and initiating structure and their relationship with leader effectiveness: A meta-analysis. *Academy of Management Journal*, 31, 201-205.
- Gil, F. & Barrasa, A. (2002). *E-Testing. Cuestionario de competencias directivas [ETesting. Managers Competences Questionnaire]*. Actual Knowledge Instruments – Addeco. Unpublished paper retrieved from http://www.addeco.es/html/ca_etes.asp

- Gil, F. (2003). Dirección y liderazgo [Management and Leadership]. In F. Gil y C. M. Alcover (Eds.), *Introducción a la Psicología de las Organizaciones* (pp. 285-319). Madrid: Alianza.
- Gil, F., Ares, A., & Barrasa, A. (2003). Dirección y liderazgo organizacional: gestión y cambio [Management and Organizational Leadership: Administration and Change]. *Encuentros en Psicología Social*, 5, 95-100.
- Gil, F., Rico, R., Alcover, C. M., & Barrasa, A. (2005). Change-Oriented Leadership, Satisfaction and Performance in Work Groups: Effects of Team Climate and Group Potency. *Journal of Managerial Psychology*, 20, 312-328.
- House, R. J. (1977). A 1976 Theory of Charismatic Leadership. In J. G. Hunt & L. L. Larson (Eds.), *Leadership: The cutting edge* (pp. 189-207). Carbondale: Southern Illinois University Press.
- Kotter, J. P. (1990). *A force for change: How leadership differs from management*. New York: Free Press.
- Lowe, K. B., Kroeck, K. G., & Sivasubramaniam, N. (1996). Effectiveness correlates of transformational and transactional leadership: A meta-analytic review of the MLQ literature. *Leadership Quarterly*, 7, 385-425.
- Munduate, L. & Medina, F. J. (2004). Power, Authority and Leadership. In Ch. Spielberger (Ed.), *Encyclopedia of Applied Psychology*. San Diego: Academic Press.
- Shamir, B., House, R. J., & Arthur, M. B. (1993). The motivational effects of charismatic leadership: A self-concept theory. *Organization Science*, 4, 1-17.
- Tushman, M. L. & Romanelli, E. (1985). Organization evolution: A metamorphosis model of convergence and reorientation. In L. L. Cummings y B. M. Staw (Eds.), *Research in Organizational Behavior* (Vol 7, pp. 171-222). Greenwich, CT: JAI Press.

- Yukl, G. (1998). An evaluative essay on current conceptions of effective leadership. *European Journal of Work and Organizational Psychology*, 8, 33-48.
- Yukl, G. (2002). *Leadership in Organizations*. Upper Saddle River: Prentice Hall.
- Yukl, G. (2003). Tridimensional leadership theory: A roadmap for flexible, adaptive leaders. En R. J. Burke & C. Cooper (Eds.), *Leading in turbulent times* (pp. 75-92). London: Blackwell.
- Yukl, G., Gordon, A., & Taber, T. (2002). A Hierarchical Taxonomy of Leadership Behavior: Integrating a Half Century of Behavior Research. *Journal of Leadership and Organizational Studies*, 9, 15-32.

ARTICLE 2

Is there an optimal size for health-care teams? Effects on team climate for innovation and performance

In health care, teams have been seen usually as one way to redesign work and to provide better levels of quality in services (McCallin, 2001). The potential advantages of working in integrated teams in health care involve increases and improvements in task effectiveness (patient health and satisfaction with care), mental health (the morale and well being of team members), and team viability (the degree to which a team will function over time) (Bower, Campbell, Bojke, & Sibbald, 2003; West & Field, 1995).

The importance of the size of groups and teams in determining the quality and the quantity of human interactions and their outcomes for members, groups, and organizations has long been recognized as an important research issue (Bray, Kerr, & Atkin, 1978; Curral, Forrester, Dawson, & West, 2001; Gooding & Wagner, 1985; Guzzo & Shea, 1992; Hackman, 1990; Littlepage, 1991; Thomas & Fink, 1963).

Group size should make differences in the ways people interact in groups and work together, and in the kinds of reactions they have in the group experience (consequences in team processes and in group outcomes).

Optimal Team Size

Research in team size suggests that the group has to be just large enough to the work: 'If a task requires four set of hands, then there should be four people in the group –but not more than that' (Hackman, 1987). Too few as well as too many group members are found to impair

performance (Tschan & Von Cranach, 1996). Teams are most effective when they have sufficient, but not greater than sufficient numbers of members to perform the group task (Guzzo, 1988; Hackman, 1990).

As a group grows larger, it also changes in other ways, generally for the worse. The research literature offers abundant evidence documenting the dysfunctions that occur in large groups (Steiner, 1972) and establishing the advantages of groups that are slightly smaller than the task technically requires. From a theoretical perspective smaller work group size is supposed to lead to increased group cohesiveness, less specialization of task, and better communication (Levine & Moreland, 1990).

How can we decide what is the optimal team size? In the classical study of Slater (1958) it was suggested that a straightforward means of estimating the ‘optimal’ group size was to simply ask what size group members prefer. In these experimental contexts with ‘human relation’ tasks an optimal size around 5 members was found by asking group members what size of group they preferred (Hackman & Vidmar, 1970; Slater, 1958).

But the question of the ‘optimal’ group size is a complex one. Research strongly suggest that it is not simply the size with which group members feel most comfortable. It is also necessary to keep in mind team performance and group output issues (Gooding & Wagner, 1985; Kerr, 1989; Littlepage, 1991; Markham, Dansereau, & Aluto, 1982).

Team size and performance

Past research has indicated an inverted *U*-shaped relationship between group size and performance, depending to some degree on task diversity and coordination requirements (Goodman, Ravlin, & Argote, 1986). The hypothetical inverted *U*-shaped relationships were proposed by the seminal work of Steiner (1972) as a way in which group size might affect the determinants of productivity. The curves are illustrative and hypothetical; although curves

probably approximate the truth concerning certain tasks and populations, they undoubtedly misrepresent the facts about many others. Curves are not intended to depict universal trends, they indicate relationships that are postulated to prevail in many situations: as group size increases, potential productivity rises at a decelerating rate, whereas process losses increase at an accelerating rate. Given this relationship, the effect of size on actual productivity is actual productivity equals potential productivity minus process losses (Steiner, 1972).

Although larger groups are potentially more productive, coordination problems and motivation losses often prevent them from achieving that potential. Deficits of coordination are one of the principal sources of process losses. Large group size can cause problems with integrating members' contributions or difficulties to create effective intra-group communication (Gooding & Wagner, 1985). The other principal source of losses is motivation: member motivation can be affected by group size since there is evidence of social loafing and more misbehavior indicating that group members often exert less effort as group size increases (Guzzo & Shea, 1992). This may be because group members feel more anonymous as they are less self-aware. Group members in overstaffed groups feel less involved in the group and the task, so the likelihood of processes like social loafing are enhanced (Tschan & Von Cranach, 1996).

Results from research on the relationship between team size and performance are ambiguous. A review of the literature by Thomas & Fink (1963) indicated that quality of performance and productivity was positively related to group size under some conditions and in no instances were smaller groups superior. However, a subsequent meta-analysis of the relationship between size and performance indicates that the relationship between subunit size and performance is non-significant or negatively related (Gooding & Wagner, 1985). In any case, reviews of the group size literature report little agreement among researchers regarding the relationship between size of group and group productivity. The majority of team-level studies

have reported invariability or negative relationships between various indices of size and performance but a few have found a positive association (Bray et al., 1978; Frank & Anderson, 1971; Hackman & Vidmar, 1970; Hirschfeld, Jordan, Field, Giles, & Armenakis, 2006; Littlepage, 1991; Markham et al., 1982; Slater, 1958).

In the experimental research context, Hackman and Vidmar (1970) using 72 groups didn't find a relation between group size and group performance (group product measures action orientation, length, originality, optimism, quality of presentation, and issue involvement) although dyads performed better than groups of other sizes. Frank and Anderson (1971), in another experiment, showed that increases in group size enhanced quantitative performance on disjunctive tasks (performance is a function of the most competent member) but was detrimental to performance on conjunctive tasks (performance is a function of the poorest member).

In applied contexts, some research has showed significant curvilinear relationship between team size and productivity outcomes, such as absenteeism (Markham et al., 1982). This supports an alternative conceptualization of the metric size, the group's own change over time in longitudinal research, which serves as a basic for comparison in determining 'small' and 'large'. In another study with air force teams, using a structural equations model of effective teamwork, the number of team members did not predict observer ratings of effective teamwork, but teams with more members had greater resources for solving problems quickly (problem-solving proficiency, $r=.20$, $p<.05$) although they required more time to complete the physical tasks (physical-task proficiency, $r=-.30$, $p<.05$) (Hirschfeld et al., 2006).

In health-care organizations, Poulton and West (1999) didn't find any relations between group size and effectiveness measures (patient-centred care, health care practice, team viability, organizational efficiency, and overall effectiveness) and Bower et al. (2003) only found a significant relationship with one of several performance outputs: larger team size was

associated with better quality disease (diabetes) management, but not with other team outcomes (quality of other chronic disease management, patient evaluation, or team self-report evaluation of effectiveness).

Team size and innovation

There are different ways to analyze the influence of the number of team members on team innovation. On the one side, larger teams may be more open to innovation than smaller teams because larger teams often have more diverse membership (and hence potentially more new ways to work, new methods, techniques, ideas) as well as more task-relevant resources that can be used to implement these new ideas. On the other side, larger teams have more directive leadership than smaller teams (Mullen, Symons, Hu, & Salas, 1989), which may discourage innovation, larger teams also experience more conflict and have more difficulty reaching consensus than smaller teams. This may reduce their likelihood of accepting and implementing innovations (Levine, Choi, & Moreland, 2003) although conflict may be positive for the early stages of innovation.

Several studies have found negative relationships between team size and innovation. In 13 work groups from all levels of an oil company, a significant and negative relationship between group size and externally rated group innovativeness ($r = -.359$, $p < .01$) was found, indicating higher innovativeness in smaller groups (Burningham & West, 1995). Another study with TV productions teams, Carter and West (1998) found that larger teams (more than 10 members) have lower levels of climate innovation and teams with a high requirement to innovate tended to be smaller than teams with a moderate innovation requirement (Curral et al., 2001).

However, theoretically it may not be a negative relationship, but a curvilinear relationship between group size and innovation. Very small teams lack the diversity of viewpoints and

perspectives necessary for developing new methods and ideas in innovation (Jackson, 1996), whereas large teams become too unwieldy to enable effective interaction, exchange, and participation (West & Anderson, 1996). So, theoretically group size will have a curvilinear and significant relationship with innovation, smaller and larger groups being least innovative. Group size had no significant relationship with overall levels of team innovation, using a sample of management teams, but team size did predict the radicalness (extent of changes to the status quo) of team innovation (West & Anderson, 1996).

Team size and team climate for innovation

A multifactorial model for innovation in workgroups by West (1990) suggests four factors including participative safety, support for innovation, objectives and vision, and task orientation.

Participation in decision making is suggested to be important in innovative performance because it may increase the likelihood that the members of the group invest in the outcomes of the decisions and that they are willing to offer new ideas to the group (participative safety).

Approval and practical support for innovation attempts to introduce new and improved ways of doing things in the work environment will facilitate team innovation (support for innovation). Groups with clearly defined shared objectives and visions are more likely to develop new useful working methods since their efforts have focus and direction (vision).

Innovative performance may also require the commitment of the group to achieve the highest possible standards of task performance in relation to shared vision or outcomes, characterized by evaluations, modifications, control systems and critical appraisals, which supports the adoption of improvements to established policies, procedures, and methods (task orientation).

As group size increases from the very small group there will be increases in the levels of participation, support for innovation, objectives and vision, and task orientation, but at some

point increases in group size will create difficulties of ensuring appropriate participation in decision making, eliciting unanimous support for innovation, agreeing objectives, and achieving consensus on what constitutes high quality.

But previous research is not clear. Using 87 teams from different industrial sectors Curral et al. (2001) found that team size correlated negatively with all four team climate processes (ranging from -.22 to -.33), and by regressing they found that team size explained a significant amount of variance in all four TCI variables (4.8% to 10.3%) as well as the team climate mean (11.1%). In another study in applied settings, Dackert, Brenner, and Johansson (2002) by comparing team members from 4 larger teams (21 to 26 members) with 17 smaller ones ($M=7.2$, $SD=2.7$), found higher mean scores on vision for larger teams, and higher mean scores on participative safety and support for innovation for smaller teams.

Specifically in the health-care context, some studies showed that small teams had higher levels of participative safety and support for innovation than the larger-sized teams (although not significant), and the smallest-sized teams were rated significantly lower than the larger-sized teams in terms of team vision (Williams & Laungani, 1999). Another study, on 68 primary care team (Poulton & West, 1999), has found that team size was significantly and negatively correlated with team climate process of participation ($r=-.33$, $p<0.05$), that is in larger teams team members rated participations lower. No other relationships between group size and team climate processes were found. Finally others didn't find any relation between team size and team climate (Bower et al., 2003) using a model of team and practice structure (group size and other seven structural variables), team processes (team climate inventory scales) and team outcomes (quality of diseases management, patient evaluation, and team self-reported effectiveness) on 42 primary health care teams.

Our hypotheses therefore suggest that the relationships between team size and team processes and outcomes are curvilinear rather than lineal. Instead of lineal relations we postulate an inverted-*U* relationship for team climate processes and team performance and innovation with team size.

The present research is an attempt to assess the effects that group size has on group processes (participation, support for innovation, objectives, and task orientation) and group outcomes (team performance and innovation).

Method

Sample

We included health-care teams from hospitals throughout Spain. All team members were working together for at least the previous year. Teams that didn't provide at least four respondents were rejected. Finally 89 teams were included in the study. Team size averaged 12.6 members ($SD=6.9$) and the total number of respondents was 406.

The average age of the team members was 40.8 years ($SD=7.9$), 48.5% women and 31.3% men, the remainder didn't answer this question. All teams consisted of a homogeneous sample: all came from public hospitals, had health-care tasks, and were responsible for their section in the organization. The sample was heterogeneous in that the teams represented different hospital areas (cardiology, digestive, oncology, orthopaedic surgery, psychiatry, respiratory, surgery, and urgencies). All teams worked together on a daily basis. The teams had overall responsibility for the activities within a defined segment and level of the organization and the team members discussed, planned and made decisions with respect to these activities.

Measures

Team Climate Inventory (TCI)

The Spanish version of the TCI (Anderson & West, 1994) was used. The questionnaire consists of 38 items related to four basic group dimensions, namely (1) participation and participation safety, (2) support for innovation, (3) objectives and vision and (4) task orientation and climate for excellence, psychometric and for validity properties see Barrasa, West, and Gil (submitted).

The questionnaire is filled out by all team members individually and is scored separately for each dimension by summing the marked figures and dividing by the number of items.

Team Innovation and Performance

Each team's performance was also rated by at least three independent experts who knew the evaluated team well, but were outside of the team, e.g. supervisors, leaders, and managers, using Ancona and Caldwell (1992) questionnaire. It is composed by 5 items, rating each team's efficiency, quality of technical innovations, adherence to schedules, adherence to budgets, and ability to resolve conflicts using 5-point Likert scale (where 1 is 'Completely disagree' and 5 is 'Completely agree').

The questionnaire has showed adequate psychometric properties with internal consistency index Cronbach's $\alpha = .82$. For teams which had been together 3 years a factor structure emerged. The first factor, innovation, was defined solely by the quality of technical innovation produced (item 2) and the second factor, labelled team operations, was defined by the remaining four items (item 1, 3, 4 and 5) (Ancona & Caldwell, 1992). Since our team sample was characterized by long time tenure (more than 5 years) we expected to find this last factorial solution with two factors: technical innovation and team operations. We deleted the item 4 related to adherence to budgets because it didn't make sense in context of health-care

organizations. As expected, two factors emerged: the first factor defined by team operation questions (items 1, 3 and 5), and the second factor by innovation question (item 2).

Procedure

The TCI was handed out to the hospitals' human resources departments, who contacted all team members. Team members were asked to participate in the research by completing the questionnaire individually and remaining anonymous. Each team member completed the questionnaire alone and returned it to the contact person within the human resource department, who returned them to the investigators.

The Team Performance Questionnaire was filled out by at least three independent expert persons in formal positions: leaders, and managers in the hospital. They had a good knowledge of the team's performance in terms of efficiency, quality of technical innovations, adherence to schedules, and ability to resolve conflicts. These persons were external, but knowledgeable of the group and in a superior position. Their responses were put into a sealed envelope and delivered to the investigators.

After data analysis, each group received feedback with respect to how their team had rated itself on the team climate dimensions compared with the average of all participating teams.

Data analyses

Descriptive analysis was carried out by dispersion plots in order to evaluate the relationship between team size variable and team climate processes, team performance and innovation. To test for the presence of nonlinear relationships we used hierarchical regression analyses. First, each dependent variable was regressed on the team size variable. Then the quadratic component of the team size variable was added to this model. Finally, by calculating the F test for the change in R^2 , it was determined whether the quadratic relationship was significant.

Since our primary goal was to understand the nature of the relationship between team size and our dependent variables significant curvilinear trends were examined as well, and finally curvilinear quadratic estimations functions of the regression were obtained.

Results

Descriptive dispersion analyses of team climate processes (participation, support for innovation, objectives, and task orientation) by number of team members show a constant incremental of team climate scores until around the 12 members, after that the scores are much more irregular and in a detrimental direction (Figure 1).

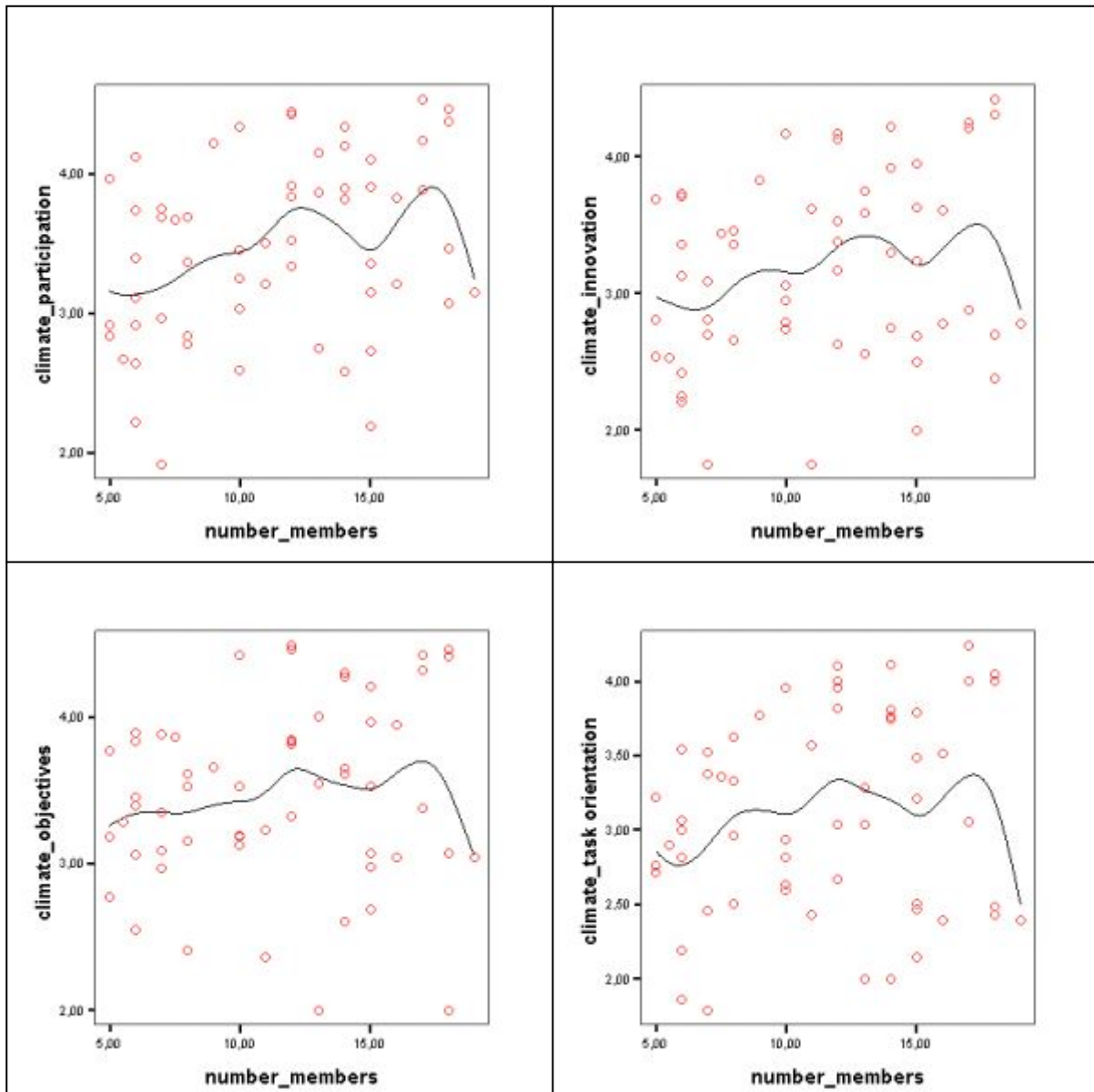


Figure 1. Distribution of team climate processes by number of team members

The team performance and innovation dispersion plots show differences between team operations (and whole team performance), and team innovation. For team operations (and whole team performance) there is an incremental according team size until some point around 10 members where the performance becomes stable with no increase. For team innovation there is a clearer increasing/decreasing line in form of an inverted curve *U*-shaped (see Figure 2).

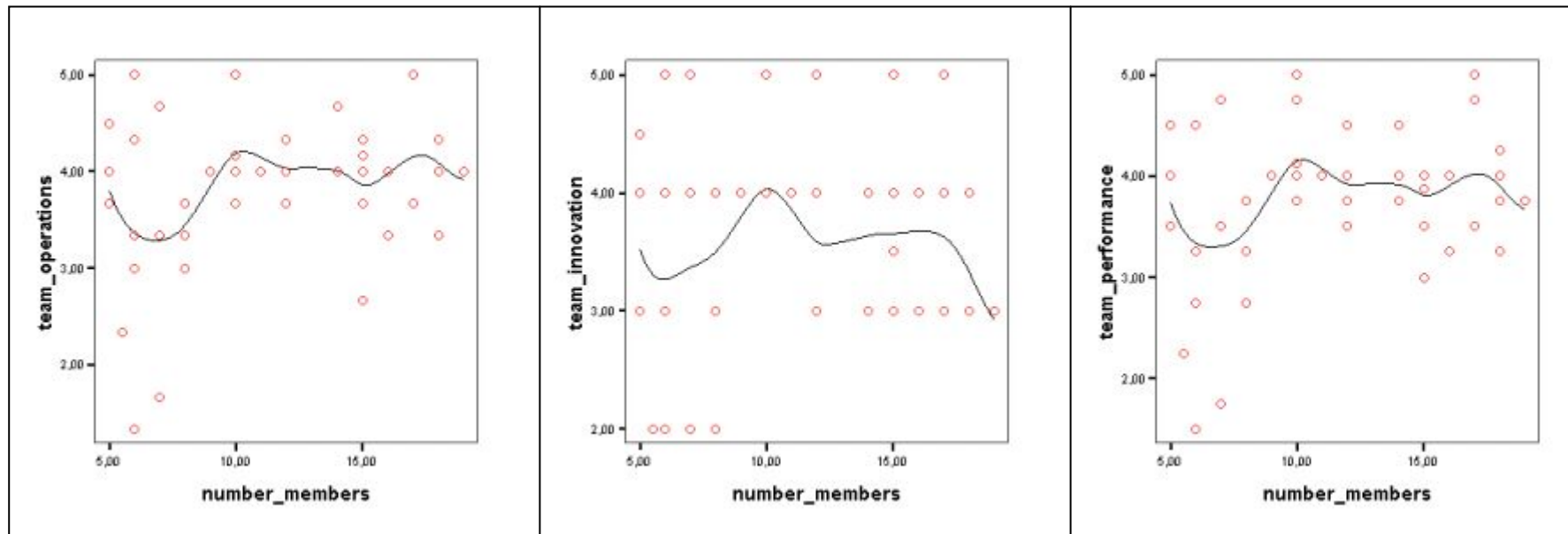


Figure 2. Distribution of team performance and innovation by number of team members

The first column of the Table 1 presents the results of the linear regression analyses conducted on the four team climate processes, and the team performance and innovation variables. Team climate processes of participation and support for innovation were significantly predicted by team size, as well as for team operations and the whole team performance measure. Columns two and three of the table present the results of the curvilinear regression analyses on the dependent variables. From these columns of the table it is apparent that the team climate processes, participation, support for innovation, and task orientation were better explained by the quadratic version of team size, including task orientation which hadn't been predicted in the linear way. This was also the case for the three measures; team performance, innovation and team innovation which hadn't been predicted in the linear way.

Table 1

Linear and quadratic regression results for number of team members

Variables	Team size		
	R^2	ΔR^2	F/df
Team climate Participation	.107 ^a	.014	3.802/55 ^b
Team climate Support for innovation	.061 ^a	.018	2.357/55 ^b
Team climate Objectives	.024	.006	.865/55
Team climate Task orientation	.046	.029	2.218/55 ^b
Team Operations	.091 ^a	.018	2.817/46 ^b
Team Innovation	.001	.049	1.731/46 ^b
Team Performance	.063 ^a	.012	2.397/46 ^b

^a Linear equation is significant ($p < .05$).

^b F , ΔR^2 for the quadratic equation is significant ($p < .05$)

We also examined curvilinear quadratic estimations functions of the regression for team climate processes (Figure 3) and for team performance and innovation measures (Figure 4) showing the fit of the curvilinear quadratic regression functions.

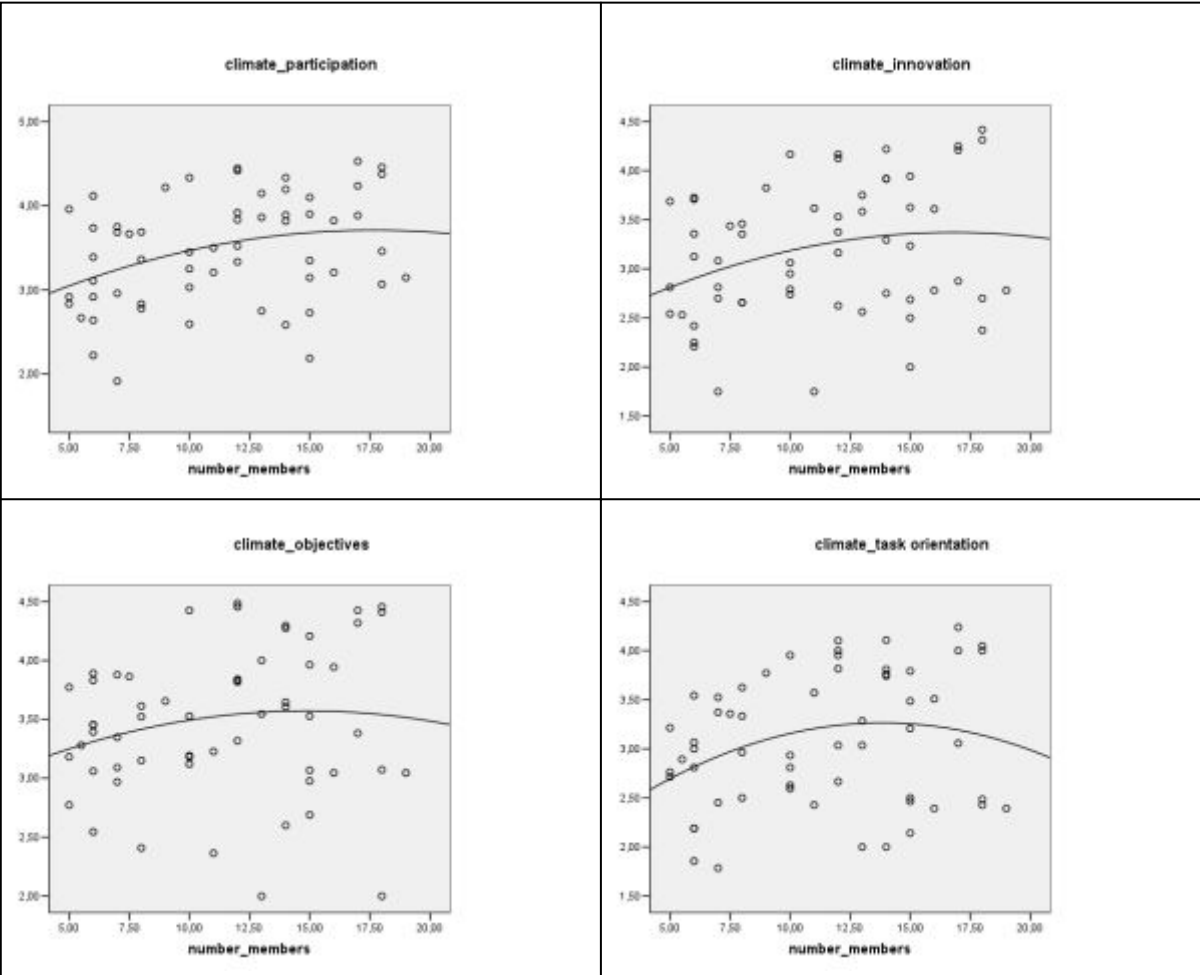


Figure 3. Curvilinear quadratic regressions of team climate processes by number of team members.

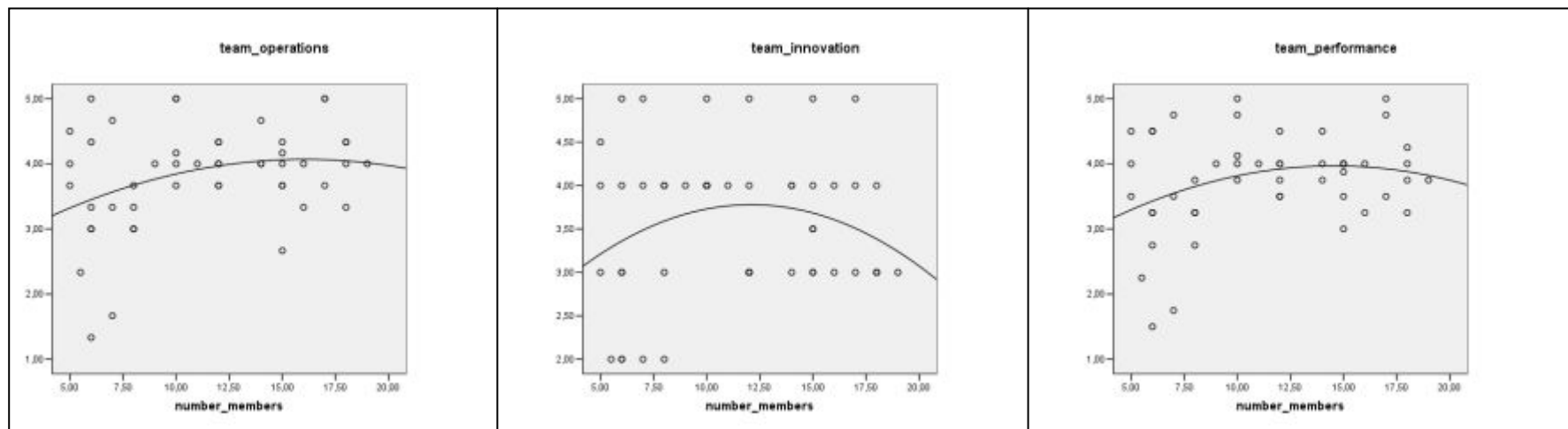


Figure 4. Distribution of team performance and innovation by number of team members

Discussion

In a broad sense, results from descriptive, linear and curvilinear regression analyses support the curvilinear hypotheses about the inverted *U*-shape nature of the relationship between team size, team processes and outcomes.

Specifically, as previous studies in the health-care organization setting have shown (Poulton & West, 1999; Bower et al., 2003) the relation between team size and team performance is not strong in any case (6% of variance for our data), but our understanding of the process improves with a curvilinear view: at some point around 12-15 members the increase in performance when increasing the team size is insignificant if not decreasing.

The relationship between team size and team innovation is revealing. Previous research has found negative relations (Burningham & West, 1995; Carter & West, 1998; Curral et al., 2001). This could depend on the range of team sizes used, as West and Anderson (1996) pointed out, in small groups the increase of size leads to increased innovation. Our data supports this postulate since there is no lineal but a curvilinear relation between team size and team innovation.

Finally, the relationships found between team size and team climate processes confirmed previous research and developed some new insights. Consistent with previous studies team climate processes of participation and support for innovation presented bivariate relationships in the linear regression and there is a linear relationship with team climate processes of participation (Williams & Laungani, 1999; Pulton & West, 1999) and support for innovation (Williams & Laungani, 1999), but these relations improve with curvilinear regressions. Team climate process of task orientation wasn't found in previous research, and in this study it presents a significant curvilinear relationship with team size. Finally, the team climate of

objectives lacks any kind of relation with team size, which is consistent with previous research where objectives presented a different behavior than the rest of TCI processes in respect to team size (Drakert, Brenner, & Johansson, 2002; Williams & Laungani, 1999).

Regarding the question on the ‘optimal’ group size; this research in health-care organizational setting suggests that as team sizes increases from some level (around 12-15 team members), there exists a decrease in team climate processes and team innovation, and an insignificant improvement in team performance. One also has to bear in mind variables like team members’ satisfaction, leadership, task type, cultural differences, organizational contexts, cohesion, or group potency.

References

- Ancona, D., & Caldwell, D. F. (1992). Bridging the boundary: External activity and performance in organizational teams. *Administrative Science Quarterly*, 37, 634-665.
- Anderson, N. R., & West, M. A. (1994). *The Team Climate Inventory: Manual and User Guide*. Windsor, Berks.: ASE Press.
- Barrasa, A., West, M. A., & Gil, F. (submitted). Climate Quality and Climate Consensus for Work Group Innovation, Performance, and Satisfaction: A conclusive view through the Spanish Validation of the Team Climate Inventory (TCI).
- Bower, P., Campbell, S., Bojke, C., & Sibbald, B. (2003). Team structure, team climate and the quality of care in primary care: an observational study. *Quality and Safety in Health Care*, 12, 273-279.
- Bray, R. M., Kerr, N. L. & Atkin, R. S. (1978). Effects of group size, problem difficulty, and sex on group performance and member reactions. *Journal of Personality and Social Psychology*, 36, 1224-1240.
- Burningham, C., & West, M. A. (1995). Individual, climate, and group interaction processes as predictors of work team innovation. *Small Group Research*, 36, 106-117.
- Carter, S. M., & West, M. A. (1998). Reflexivity, effectiveness, and mental health in BBC-TV production teams. *Small Group Research*, 29, 583-601.
- Curral, L. A., Forrester, R. H., Dawson, J. F., & West, M. A. (2001). It's what you do and the way that you do it: Team task, team size, and innovation-related group processes. *European Journal of Work and Organizational Psychology*, 10, 187-204.
- Dackert, I., Brenner, S. O., & Johansson, C. R. (2002). Team Climate Inventory with a merged organization. *Psychological Reports*, 91, 651-656.
- Drach-Zahavy, A. (2004). Exploring team support: The role of team's design, values, and leader's support. *Group Dynamics*, 8, 235-252.

- Frank, F., & Anderson, L. R. (1971). Effects of task and group size upon group productivity and member satisfaction. *Sociometry*, 34, 135-149.
- Gooding, R. Z., & Wagner, J. A. (1985). A meta-analytic review of the relationship between size and performance: The productivity and efficiency of organizations and their subunits. *Administrative Science Quarterly*, 30, 462-481.
- Goodman, P. S., Ravlin, E. C., & Argote, L. (1986). Current Thinking About Groups: Setting the Stage for New Ideas. In P. S. Goodman (Ed.), *Designing Effective Work Group* (pp. 1-33). San Francisco: Jossey-Bass.
- Guzzo, R. A. (1988). Financial incentives and their varying effects on productivity. In P. Whitney, & R. B. Ochsman (Eds.), *Psychology and productivity* (pp. 81-92). New York: Plenum Press.
- Guzzo, R. A., & Shea, G. P. (1992). Group performance and intergroup relations in organizations. In M. D. Dunnette, & L. M. Hough (Eds.), *Handbook of Industrial and Organizational Psychology Vol. 3* (pp. 269-313). Palo Alto, CA: Consulting Psychologists Press.
- Hackman, J. R. (1987). The design of work teams. In J. Lorsch (Ed.), *Handbook of organizational behavior* (pp. 315-342). New York: Prentice Hall.
- Hackman, J. R. (1990). *Groups that work (and those that don't): Creating conditions for effective teamwork*. San Francisco: Jossey-Bass.
- Hackman, J. R., & Vidmar, N. J. (1970). Effects of size and task type on group performance and member reactions. *Sociometry*, 33, 37-54.
- Hirschfeld, R. R., Jordan, M. H., Field, H. S., Giles, W. F., & Armenakis, A. A. (2006). Becoming team players: team members' mastery of teamwork knowledge as a predictor of team task proficiency and observed teamwork effectiveness. *Journal of Applied Psychology*, 91, 467-474.

- Jackson, S. E. (1996). The consequences of diversity in multidisciplinary work teams. In M. A. West (Ed.), *Handbook of work group psychology* (pp. 53-76). Chichester: Wiley.
- Kerr, N. L. (1989). Illusions of efficacy: The effects of group size on perceived efficacy in social dilemmas. *Journal of Experimental Social Psychology*, 25, 287-313.
- Levine, J. M., & Moreland, R. (1990). Progress in small group research. *Annual Review of Psychology*, 41, 585-634.
- Levine, J. M., Choi, H. S., & Moreland, R. L. (2003). Newcomer Innovation in Work Teams. In P. B. Paulus, & B. A. Nijstad (Eds.), *Group Creativity. Innovation Through Collaboration* (pp. 202-224). Oxford: Oxford University Press.
- Littlepage, G. E. (1991). Effects of group size and task characteristics on group performance: a test of Steiner's model. *Personality and Social Psychology Bulletin*, 17, 449-456.
- Markham, S. E., Dansereau, F., & Aluto, J. A. (1982). Group size and absenteeism rates: A longitudinal analysis. *Academy of Management Journal*, 25, 921-927.
- McCallin, A. (2001). Interdisciplinary practice - a matter of teamwork: an integrated literature review. *Journal of Clinical Nursing*, 10, 419-428.
- Mullen, B., Symons, C., Hu, L., & Salas, E. (1989). Group size, leadership behavior, and subordinate satisfaction. *Journal of General Psychology*, 116, 155-170.
- Poulton, B. C., & West, M. A. (1999). The determinants of effectiveness in primary health care teams. *Journal of Interpersonal Care*, 13, 7-18.
- Slater, P. E. (1958). Contrasting correlates of group size. *Sociometry*, 21, 129-139.
- Steiner, I. D. (1972). *Group Process and Productivity*. New York: Academic Press.
- Thomas, E. J., & Fink, C. F. (1963). Effects of group size. *Psychological Bulletin*, 60, 371-384
- Tschan, F., & Von Cranach, M. (1996). Group task structure, processes and outcome. In M. A. West (Ed.), *Handbook of work group psychology* (pp. 95-121). Chichester: Wiley.

- West, M. A. (1990). The social psychology of innovation in groups. In M. A. West y J. L. Farr (Eds.), *Innovation and Creativity at Work. Psychological and Organizational Strategies* (pp. 309-333). Chichester: Wiley.
- West, M. A., & Anderson, N. R. (1996). Innovation in top management teams. *Journal of Applied Psychology*, 81, 680-693.
- West, M. A., & Field, R. (1995). Teamwork in primary health care: perspectives from organisational psychology. *Journal of Interprofessional Care*, 9, 117-122.
- Williams, G., & Laungani, P. (1999). Analysis of teamwork in an NHS Community Trust: an empirical study. *Journal of Interprofessional Care*, 13, 19-28.

ARTICLE 3

Change-oriented leadership, satisfaction and performance in work groups. Effects of team climate and group potency

Abstract

The transformations currently affecting organizations require the design of team-based structures, a task for leaders seeking effective change management. The literature on the subject of leadership basically rests on a bi-dimensional model (the task-oriented and relation-oriented leader), though room has been found recently for new paradigms (transformational and charismatic leadership). The tri-dimensional model proposed by Yukl (2004) incorporates change among the conventional categories, making it compatible with the received literature, despite significant differences. The objective of this paper is to analyze the impact of change-oriented leaders on group outcomes. To achieve this, we propose an explanatory model in which the group climate (in particular as it relates to innovation) represents the nexus mediating between change-oriented leadership and group outcomes, while group potency reinforces the relationship. The results confirm these relationships in general. The paper discusses theoretical implications of this study, sets out some practical applications, and remarks some trends for future research.

Introduction

Teams form the basic functional unit of organizations (Mohrman, Cohen, & Mohrman, 1995). Practically all them, including healthcare institutions (Heinemann & Zeiss, 2002; Poole & Real, 2003), use teams in one way or another. The organizational outcomes therefore depend

on appropriate design and the proper functioning of work units and teams (Guzzo & Dickson, 1996). Research has revealed the importance of group structures and processes for team outcomes, and numerous models and constructs have been proposed (see Salas, Stagl, & Burke, 2004).

One main variable is leadership, even so, only a few models (Avolio, Jung, Murry, & Sivasubramaniam, 1996; Gladstein, 1984; Kozlowski, Gully, Salas & Cannon-Bowers, 1996; Stewart & Barrick, 2002) explicitly take leadership into account as a determining factor in team outcomes.

Nevertheless, leadership (or the lack of it) has been identified as a key variable for the functioning of teams and one of the main reasons for the success or failure with which team-based work systems are implemented (Katzenbach, 1997).

The leadership research is based on the classical bi-factorial models, although more recently has been developed ‘new paradigms’, as charismatic and transformational leadership, among others. The links between different forms of leadership and team outcomes as proposed in these models are not, however, wholly consistent (Bass, Avolio, Jung, & Berson, 2003; Stewart & Barrick, 2000), which suggests a need for further research.

The *three-dimensional leadership* model, recently developed by Yukl (Yukl, 2004; Yukl, Gordon, & Taber, 2002), identifies three major categories, adding *change* dimension to the classical bi-factorial models (*task* and *relation*-oriented leadership). By proposing the incorporation of the category of change, the tri-dimensional model allows the integration of the two major traditions of *management* and *leadership* theory, which have normally stood apart, each with its own literature. Rather than seeking to establish distinctions between managers and leaders, the two can be explained jointly using the same processes and models (Yukl, 2002). The view that both leaders and managers employ a mix of leadership and management behaviors appears much closer to reality so that they must combine the

necessary skills to direct day-to-day affairs effectively (a role traditionally associated with management) while at the same time anticipating and managing change (leadership main role).

Change-oriented leadership

As a consequence of globalization, application of new technologies, coping with a turbulent environment, etc., organizations face with ongoing processes of transformation. They assign the responsibility of anticipating change and providing guidance to their managers, executives and leaders (Kotter, 1990) who need new roles (Shamir, 1999). The transformational and charismatic leadership theories (Bass, 1985; Conger & Kanungo, 1988; House, 1977) refer to certain kinds of change-oriented behavior, and there is considerable evidence that such patterns are related to effective leadership, as shown in the meta-analysis carried out by Lowe, Kroeck, & Sivasubramaniam (1996).

The three-dimensional model proposed by Yukl (2004) is compatible with the transformational and charismatic leadership theories, although its aim is in fact to explain leadership processes at a different conceptual level of analysis. This model seeks to describe the influence of leaders on *organizational processes* (rather than on the motivation and perceptions of subordinates), analyze *contingent* (as opposed to universal) aspects of effective leadership, and highlight the importance of leadership *processes* (instead of focusing on a leader figure). It also represents an effort to identify the behavior patterns that make up each category, in such way that: each type of behavior is observable, is potentially applicable to leaders of all kinds in organizations, is fundamentally relevant to the category in question, and is based on prior theory and research.

Change management is raised in a variety of organizational theories (Tushman & Romanelli, 1985) and is supported by current research (Ekvall & Arvonen, 1991; Gil, Ares, & Barrasa,

2003; Yukl, 1998; Yukl, Gordon, & Taber, 2002). This category comprises the following behavior sets: monitoring the environment, encouraging innovative thinking, explaining need for change, envisioning change, and taking personal risks.

Model of the relationship between change-oriented leadership, satisfaction and performance

The aim of this research is to analyze the influence the change-oriented leader can have on the team outcomes, performance and satisfaction, mediated by some team processes. We propose (see Figure 1) that the relationship between leadership and outcomes is mediated by the team climate, and that this mediation is reinforced by group potency.

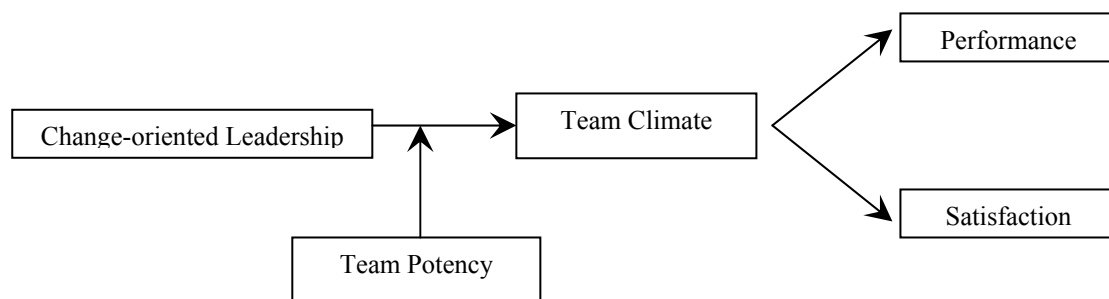


Figure 1. Proposed Model

Team climate

Team climate have been defined as shared perceptions referring to the ‘proximal work group’. This is considered as the ‘permanent or semi-permanent team to which individuals are assigned, whom they identify with, and whom they interact with regularly in order to perform work-related tasks’ (Anderson & West, 1998, p. 236). These authors developed the *TCI*

(*Team Climate Inventory*) applied to innovation and identified four factors: *vision*, *participation*, *task orientation*, and *support for innovation*. The last one is defined as ‘... the expectation, approval and practical support of attempts to introduce new and improved ways of doing things in the work environment’ (West, 1990, in Anderson & West, 1998, p.240). Of these four factors, support for innovation has been confirmed as the most consistent predictor of team innovations in external evaluations (Burningham & West, 1995). The *TCI* questionnaire was developed and is mainly used to evaluate the predictive dimensions of innovation, though it is also considered useful in appraisals of other group outcomes (Anderson & West, 1998).

Although leadership and climate are two variables that are implicitly interlinked in research, theoretical development and empirical research are limited. In the early theories and research, leadership is proposed as an organizational factor affecting perceptions of climate. In the classic study by Lewin, Lippitt, and White (1939), it was observed that varying leadership styles induced experimentally (authoritarian, democratic and *laissez faire*) influenced perceptions of climate and the behavioral responses of subjects. Litwin and Stringer (1968), who created organizations directed by leaders exhibiting styles (bureaucratic, cooperative and productivity-oriented), obtained similar results. Kozlowski & Doherty (1989) find that the interaction between the leader and the subordinate had a significant impact on perceptions of climate. González-Navarro, Bravo, González-Romá, Zurriaga, and Peiró (1993) analyzed leader–member relations in primary healthcare teams, confirming the positive relationship between leadership styles focusing on people or tasks and perceptions of climate in various dimensions (support, goals, innovation and rules). However, they were unable to substantiate other hypotheses related with perceptions of the influence of the coordinator. Mañas, González-Romá, and Peiró (1999), meanwhile, performed a longitudinal study in which they demonstrated concurrent effects in the leader–members relationship, but not deferred effects.

Studies of the relationship between leadership and climate have been confined to exploring the links between the classical dimensions of leadership (focusing on the task and the relationship), in particular through the analysis of leader–member interactions (Kozlowski & Doherty, 1989; Mañas, González-Romá, & Peiró, 1999; González-Navarro et al., 1993), but they don't consider change or similar leadership dimension. Furthermore, the majority of these studies use measures of organizational climate rather than specific team climate measures such as those provided by the *TCI*. A model has recently been proposed (West & Hirst, 2003), in which these climate variables mediate the relationship between the context (both group and organizational) and innovation, assigning a moderating role to leadership, but this model has not been definitely proved.

A number of studies (Bass et al., 2003; Carron, 1982; Spink, 1998) provide empirical support for the mediation effect of group processes between leadership and outcomes. Team climate, as it provides an indicator of significant group processes, has a mediating role between leadership and outcomes (performance and satisfaction). We propose the same relationship to change-oriented leadership, as well that to the climate of innovation, the most closely linked process.

Hypothesis 1. The relationship between change-oriented leadership and team performance is mediated by the global climate (*H1a*) and by the climate of innovation (*H1b*).

Hypothesis 2. The relationship between change-oriented leadership and team satisfaction is mediated by the global climate (*H2a*) and the climate of innovation (*H2b*).

Group Potency

Potency is a construct between self-efficacy and collective motivation (Alcover & Gil, 2000), has been defined as 'the collective belief in a group that it can be effective' (Guzzo, Yost,

Campbell, & Shea, 1993, p. 87). Teams differ from each other depending on the collective belief of their members in their potential effectiveness as such. This belief is related with current levels of effectiveness, appears to act both as cause and consequence, and is influenced by the contexts within which groups act.

Group potency has been identified as a significant cognitive influence on performance (Gil & Alcover, 2002; Guzzo et al., 1993; Jordan, Field, & Armenakis, 2002; Pearce, Gallagher, & Ensley, 2002). Campion et al. (1993; 1996) found that group potency was a significant predictor not only of productivity, but also of the satisfaction of team members and management assessments of its performance. Group potency was the only variable that significantly predicted all measures in both studies. The meta-analysis recently carried out by Gully, Joshi, Incalcaterra, & Beaubien (2002) confirms the positive relationship between potency and performance.

The relationship of a number of group variables with potency has also been explored. These include flexibility in the composition of teams (Alcover & Gil, 1999), leadership and, in particular, transformational and team leadership (Bass et al., 2003; Kahai & Sosik, 1998; Sivasubramaniam, Murry, Avolio, & Jung, 2002; Sosik, Avolio, & Kahai, 1997; Sosik, Avolio, Kahai, & Jung, 1998). Shamir, House, and Arthur (1993) explain that charismatic leadership may boost participation in group effort and can be linked to the collective identity, increasing potency and performance. The majority of models and studies concerning the relationship between leadership and group performance treat potency as a mediating variable (Bass et al., 2003; Lester, Meglino, & Korsgaard, 2002; Sivasubramaniam et al., 2002).

Potency may also, however, be considered as a variable that moderates the relationship between leadership and other variables. For example, Foels, Driskell, Mullen, and Salas (2002) have confirmed the existence of this moderating effect between democratic leadership and satisfaction.

As far as leaders who promote change are concerned, the moderating effect of potency may be understood to the extent that it may be assumed teams will react differently to the leaders' demands depending on their group potency. Thus, where the demand for change brings uncertainty and risk, it is likely that the more self-confident teams will more readily accept this with a positive impact on group processes (climate, and especially the climate of innovation).

Referring to the challenges facing actual organizations, Shamir (1999) assigns to leaders the difficult tasks of instilling a sense of psychological safety to help people cope with the anxiety inherent in uncertainty and change, and of providing the conditions of stability and continuity necessary for individual and organizational learning. Some of these conditions will be met when teams have a high level of group potency.

Finally, though the influence of different group processes on potency has been examined (Lester et al., 2002), one unexplored factor is the relationship between group potency and other beliefs about the team, in particular as regards the team climate.

We propose the following hypotheses in relation to the moderating effect of potency on team climate.

Hypothesis 3. The relationship between change-oriented leadership and team climate (*H3a*) and climate of innovation (*H3b*) are moderated by potency with positive effects.

Similarly, we predict a more general effect, such that potency influences the climate mediation process between leadership and outcomes variables.

Hypothesis 4. Potency positively reinforces global team climate (*H4a*) and climate innovation (*H4b*) mediation between change-oriented leadership and team performance.

Hypothesis 5. Potency positively reinforces global team climate (*H5a*) and climate innovation (*H5b*) mediation between change-oriented leadership and team satisfaction.

Method

Sample

The sample comprises 318 healthcare professionals of 78 healthcare teams at different public hospitals throughout Spain (Madrid, Barcelona, Málaga, La Coruña, Sevilla and Cádiz). Eleven teams were discarded because don't complete an appropriate number of responses from members (teams with a response rate of below 30% of total members) or because they lacked at least two external measures of performance. 67 teams formed the final sample. In all cases, the organizations were formally designed around work units (teams). The work teams were defined in accordance with the proximal work group concept discussed above. The size of the work teams ranged from 3 to 24 members, with an average per team of 10.6 (SD = 5.33). The response rate obtained was 68.4%. Females comprise 66.4 % of the sample. The average age of subjects was 41.4 years (SD = 8.65).

Measures

Because this study was performed at the level of the team, having collected questionnaires at individual level, it was necessary first to aggregate data in order to obtain the team construct. The *ICC* (intra-class correlation) index provides an indication of the extent to which the perceptions of group members are shared; it compares the inter-group with the intra-group variance (Chan, 1998; Kenny & LaVoie, 1985). The higher the *ICC* index, the greater is the variance at the individual level attributable to the relevant team. Normally, an *ICC* of over 0.20 is considered to indicate that a variable may be labeled a group attribute, justifying aggregation. All of the aggregate variables are significantly higher than this threshold: change-oriented leadership (0, 60), group potency (0, 59), team climate (0, 55), climate of innovation (0, 53) and satisfaction (0, 52).

Change-oriented leadership. Behavior associated with change-oriented leadership is evaluated using a recent version of questionnaire Managerial Practices Survey (TRCQ-15G) designed by Yukl on the basis of earlier inventories (Yukl et al., 2002). The questionnaire comprises three scales: task, relation and change-oriented leadership. Earlier studies have demonstrated that the psychometric characteristics of this questionnaire are appropriate (Yukl, 1998; Yukl et al., 2002; Gil et al., 2003). The change-oriented leadership scale contains 5 subscales with 4 items each. These subscales are monitoring the environment ($\alpha = 0.90$); encouraging innovative thinking ($\alpha = 0.66$); explaining need for change ($\alpha = 0.95$); envisioning change ($\alpha = 0.93$); and taking personal risks ($\alpha = 0.96$). Some items of the first two subscales are: '*analyzes external events and trends to identify threats and opportunities*' and '*asks people to look at a problem from a different perspective*'.

The response emphasizes magnitude rather than frequency (1 = not at all, 5 = to a great extent, with the option of 'don't know' or 'not applicable'). An aggregate measure was obtained at the team level ($ICC = 0.60$).

Team climate. We used the *TCI (Team Climate Inventory)* designed by Anderson and West (1994). The inventory contains 38 items ($\alpha = 0.96$; $ICC = 0.55$) with 5-point Likert responses (1 = disagree completely, 5 = completely agree) grouped into 4 factors comprising objectives (11 items, $\alpha = 0.93$); participation (12 items, $\alpha = 0.94$); task orientation (7 items, $\alpha = 0.84$); and innovation (8 items $\alpha = 0.82$, $ICC = 0.53$). Some items are '*Everyone's view is listened to, even if it is in a minority*' (participation) and '*The team is open and responsive to change*' (innovation).

Group potency was assessed using Guzzo et al. (1993) scale of 8 items ($\alpha = 0.88$; $ICC =$

0.59). Some items are '*This team believes it can become unusually good at producing high-quality work*' and '*This team feels it can solve any problem it encounters*'. Responses were scored using a 6-point Likert scale (1= disagree completely, 6 = completely agree).

Satisfaction. Team satisfaction was assessed using Gladstein's (1984) scale of 3 items ($\alpha = 0.85$; $ICC = 0.52$), which indicate the degree to which subjects display satisfaction with their colleagues, the manner of team working and with the team as a whole. Responses were scored using a 5-point Likert scale (1 = disagree completely, 5 = completely agree).

Team performance. Team performance was assessed via external supervisors and managers with a good knowledge of the team. Each team has been scored as a unit. A scale applied by Ancona and Caldwell (1992) was used. This comprises 5 items related to team's efficiency, quality of technical innovations, adherence to schedules, adherence to budgets and ability to resolve conflicts ($\alpha = 0.83$). Each dimension was scored by managers using a 5-point Likert scale (1 = disagree completely, 5 = completely agree). Between two and three evaluations were obtained from various supervisors and managers (teams without at least two such evaluations were discarded), resulting in an inter-judge coefficient of 0.74.

Finally, the control measures employed were *team size* (number of team members) with an average of 10.6 (SD = 5.33), and *team tenure* (time each member form part of the team) with an average of 9.6 (SD = 5.49). The ICC was 0.59.

Procedure

Through Human Resources departments of each Hospital we held meetings with chiefs and managers responsible for the work units concerned to explain the research project. Team

members were invited to participate voluntarily by completing an individual and anonymous questionnaire. External supervisors and managers were also asked to complete a specific questionnaire, also individually and anonymously, to score group performance.

Results

Descriptive statistics and correlation coefficients for all of the variables are presented in Table I. The diagonal line reflects the Cronbach α for the scales used in this study. Firstly, the team size and tenure variables are not correlated with any of the variables forming part of the model tested, with the exception of the first variable with group performance. Change-oriented leadership and potency are significantly correlated ($p < 0.01$ in both cases) with group performance and satisfaction respectively. The relationship between potency and satisfaction is particularly high ($r = 0.84$). The climate measures, meanwhile, are also significantly correlated among themselves ($p < 0.01$) and high with $r = 0.93$. These climate measures are also significantly correlated ($p < 0.01$) with performance and satisfaction, although these relationships are stronger over all in the latter case.

Table 1

Means, Standard Deviations and Correlations of Variables at Team Level

	<i>M</i>	<i>DT</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>
1. Change-oriented Leadership	3,00	0,86	(0,94)							
2. Group Potency	4,18	0,84	0,60**	(0,88)						
3. Team Climate	3,34	0,61	0,63**	0,86**	(0,96)					
4. Team Climate. Innovation	3,22	0,72	0,53**	0,83**	0,93**	(0,82)				
5. Team Size	10,59	5,33	0,15	0,03	0,10	0,02	-			
6. Team Tenure	9,58	5,49	0,07	0,09	0,05	0,00	0,16	-		
7. Team Effectiveness	3,77	0,69	0,46**	0,54**	0,56**	0,56**	0,26*	0,15	-	
8. Satisfaction	3,49	0,75	0,51**	0,84**	0,85**	0,82**	0,09	0,18	0,55**	(0,85)

Note: * $p < 0.05$; ** $p < 0.01$. Internal consistency of the scales on the diagonal.

In order to test hypotheses 1a and 1b regarding the mediation of team climate as group process in the relationship between change-oriented leadership and team performance, we carried out a set of hierarchical regressions along the lines described by Baron and Kenny (1986) for such cases. As shown in Table 2, the global climate and the climate of innovation mediate the relationship between change-oriented leadership and performance. In both cases, the results reflected in Table II reveal that the effect of change-oriented leadership on team performance diminishes when the global climate and the innovation climate are controlled. Signification results for changes in the coefficients following the Sobel test (1982) were significant for global climate ($z=2,93$; $p < 0,01$) and for the climate of innovation ($z=2,72$; $p < 0,01$).

Table 2

Results of Hierarchical Regression Analyses Testing for Mediation Affecting Performance and Satisfaction^a

Step	Independent Variable	Testing for Mediation Affecting					
		Performance			Satisfaction		
		β	R^2	ΔR^2	β	R^2	ΔR^2
1	Team Size	,02	,08	,08	,07	,00	,00
	Team Tenure	-,00			-,00		
2	Change-oriented Leadership	,39**	,25	,17**	,50**	,25	,25**
3	Change-oriented Leadership	,03	,35	,09*	-,04	,73	,48**
	Team Climate	,47**			,89**		
1	Team Size	,02	,08	,08	,07	,00	,00
	Team Tenure	-,00			-,00		
2	Change-oriented Leadership	,39**	,25	,17**	,50**	,25	,25**
3	Change-oriented Leadership	,11	,34	,09**	,10	,68	,43**
	Team Climate. Innovation	,41**			,76**		

Note: ^a N = 67 (teams); * p<.05, ** p<.01.

The hierarchical regression analysis used to test the mediating effect of team climate and innovation climate (hypotheses 2a and 2b) on the relationship between change-oriented leadership and group satisfaction produced results to support both hypotheses (see Table 2). Thus, we observed an increment of 0.48 and 0.43 respectively for R^2 , both being significant at the level of 0.01 for the purposes of controlling the effect of the three perceptions of climate on the relationship between change-oriented leadership and satisfaction. Checks performed using the Sobel test (1982) were also significant in the case of the global climate ($z = 6,20$; $p < 0,01$) and for the climate of innovation ($z = 4,83$, $p < 0,01$).

Hypotheses 3a and 3b respectively predicted that potency would have a moderating effect on the relationship between change-oriented leadership and the team members' perceptions of

climate. These hypotheses were tested separately for global climate and for the innovation climate subscale using hierarchical regressions. This moderation would be supported by a significant change in the square of the multiple correlation coefficient (R^2) where the interaction between change-oriented leadership and group potency was included. As reflected in Table III, such moderation does indeed appear for the global team climate ($\Delta R^2 = 0.02$; $p < 0.01$) and for the climate of innovation ($\Delta R^2 = 0.03$; $p < 0.01$) (see also Figures 2 and 3).

Table 3

Results of Hierarchical Regression Analyses Testing for Moderation^a

Step	Independent Variable	Team Climate	Team Climate. Innovation
1	Team Size	,01	,02
	Team Tenure	,01	-,14
	R^2	,01	,02
2	Change-oriented Leadership	,61**	,51**
	R^2	,37	,28
	ΔR^2	,36**	,26**
3	Group Potency	,75**	,82**
	R^2	,75	,71
	ΔR^2	,36**	,43**
4	Change-oriented Leadership x Group Potency	,16	,17**
	R^2	,78	,74
	ΔR^2	,02**	,03**

Note: ^a N = 67 (teams); * $p < .05$, ** $p < .01$

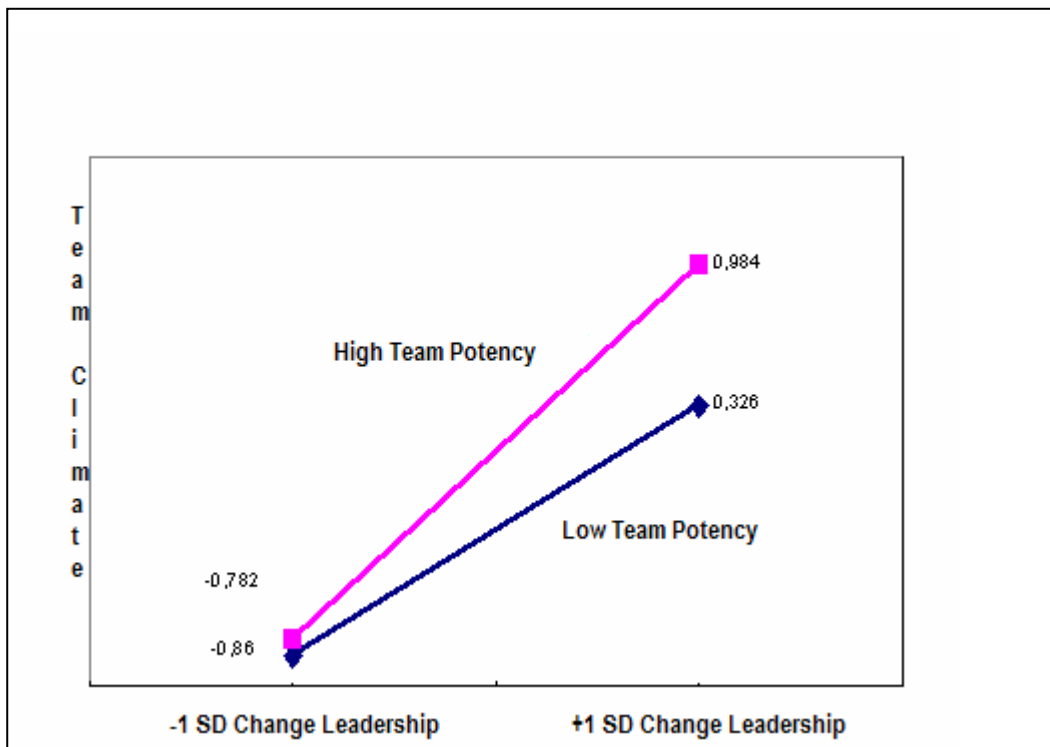


Figure 2
Interaction Effect of Team Potency and Change-Oriented Leadership on Team Climate.

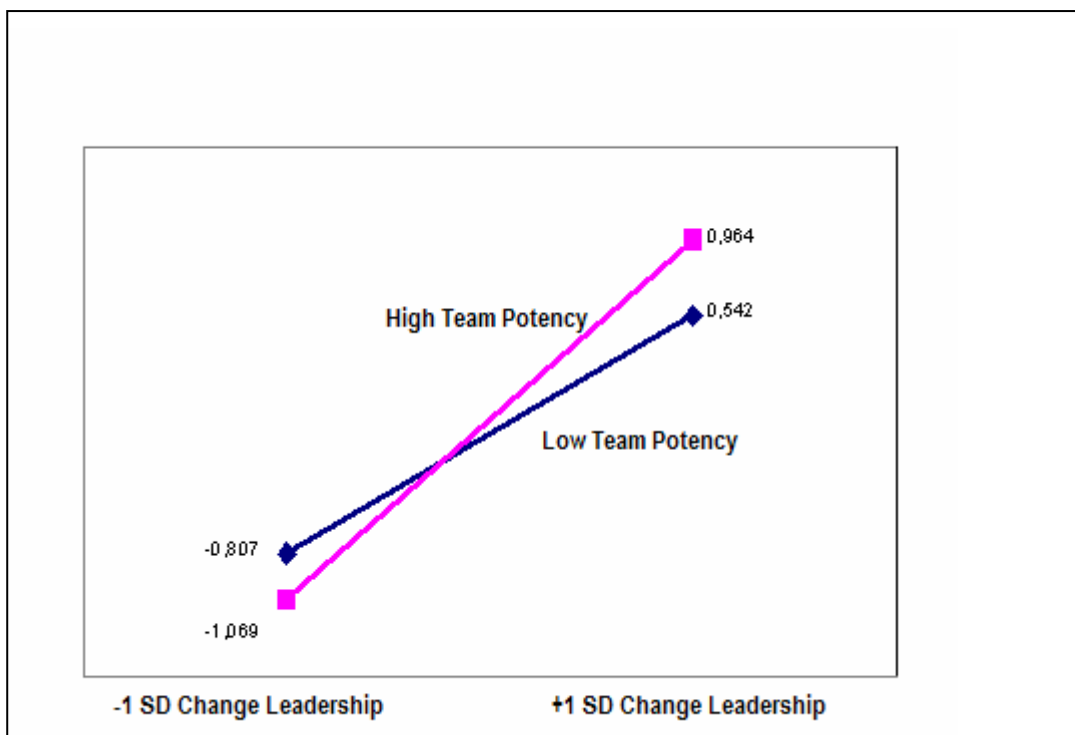


Figure 3
Interaction Effect of Team Potency and Change-Oriented Leadership on Team Innovation Climate.

In order to verify hypotheses 4a and 4b regarding the combination of effects moderating group potency in the mediation tested in hypotheses 1a and 1b (mediation of team climate and innovation climate between change-oriented leadership and performance), the teams were divided using the median as the cut-off point ($Mdn=4.20$) into high ($M=4.87$; $SD=0.40$) and low ($M=3.45$; $DT=0.48$) group potency classes. Separate hierarchical regression analyses were performed on each class. This verified the mediation of global climate and the innovation climate between change-oriented leadership and performance in high potency but not in low potency teams (see Table 4). The results reflected in these Table reveal that the effect of change-oriented leadership on team performance diminishes when the global climate and the innovation climate are controlled, but only in teams with high group potency. Signification results for changes in the coefficients following the Sobel test (1982) were significant for global climate ($z=2.47$; $p<0.05$) and for the climate of innovation ($z=1.97$; $p<0.05$).

Table 4

Results of Hierarchical Regression Analyses Testing for Mediation Affecting Performance and Satisfaction for Low and High Potency Teams ^a

Step	Independent Variable	Testing for Mediation Affecting											
		Performance						Satisfaction					
		Low			High			Low			High		
		β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2
1	Team Size	0,09			0,22			0,20			-0,01		
	Team Tenure	-	0,08	0,08	0,00	0,08	0,08	0,07	0,09	0,09	-0,04	0,00	0,00
2	Change-oriented Leadership	0,26	0,20	0,12	0,29	0,19	0,11*	0,33	0,23	0,14*	0,15	0,04	0,03
3	Change-oriented Leadership	0,21			-0,31			0,13			-0,24		
	Team Climate	0,12	0,23	0,02	0,78	0,39	0,20**	0,76	0,57	0,33**	0,81*	0,61	0,57**
1	Team Size	0,09			0,22			0,20			-0,01		
	Team Tenure	-	0,08	0,08	0,00	0,08	0,08	0,07	0,09	0,09	-0,04	0,00	0,00
2	Change-oriented Leadership	0,26	0,20	0,12	0,29	0,19	0,11*	0,33	0,23	0,14*	0,15	0,04	0,03
3	Change-oriented Leadership	0,21			-0,13			0,26			-0,11		
	Team Climate. Innovation	0,21	0,24	0,01	0,64	0,35	0,18**	0,61	0,51	0,28**	0,69*	0,53	0,49**

Note: ^a N = 33 (teams); * p<.05, ** p<.01.

Teams were divided into high and low potency groups in the same way in order to test hypotheses 5a and 5b regarding the existence of a combination of the moderating effect of group potency on the mediation of team and innovation climate between change-oriented leadership and satisfaction. This verified that there is no mediation of global climate and the innovation climate between change-oriented leadership and satisfaction in high potency teams. Such mediation was, however, found to exist in low potency teams (see Table IV). The results reflected in these Table reveal that the effect of change-oriented leadership on team performance diminishes when the global climate and the innovation climate are controlled, but only in teams with low group potency. Signification results for changes in the coefficients following the Sobel test (1982) were significant for global climate ($z=2,31$; $p<0,05$), but not for the climate of innovation ($z=1.14$; $p<0,25$).

Discussion

Summary of results and conclusions

The results provide empirical support for hypotheses 1a and 1b regarding performance, and for hypotheses 2a and 2b regarding satisfaction. This confirms the existence of a general mediation effect of global climate, and of the innovation climate, on the relationship between change-oriented leadership and both team outcomes, performance and satisfaction.

Empirical support is also provided for hypotheses 3a and 3b regarding the moderating effect of potency on the relationship between change-oriented leadership and global climate and innovation climate. This relationship is maximized in high potency teams, but is hardly visible for low potency teams.

Finally, we have found uneven empirical evidence for the last hypotheses. Thus, we found empirical support for hypotheses 4a and 4b regarding performance to the extent that the mediation effect is reinforced in high potency teams but vanishes in low potency teams. Contrary to our expectations, in hypotheses 5a and 5b, relatives to satisfaction, mediation is reinforced in low potency teams and vanishes in high potency teams.

In general, the results of present study offer considerable empirical support for the proposed model. The only unexpected result concerns the moderating effect of potency on the mediation of climate between leadership and satisfaction, which is contrary to the performance results. This may in part be because the two measures differ (aggregated subjective evaluations of satisfaction by the individual subjects in the first case, and external performance scorings by managers in the second). In any case, it is surprising that climate might mediate between the change-oriented leaders and satisfaction only in low potency teams. This fact might be explained by considering that proposals for change made by the leader may have certain attractiveness in that they presuppose innovation and improvement.

Thus, satisfaction would increase to the extent that such proposals are launched in a favorable climate, since satisfaction is strongly associated with a positive climate. This does not, however, work for high potency teams, possibly because their own self-confidence is a powerful, and perhaps sufficient, source of satisfaction, which may diminish the influence of other variables, including the proposals made by the change-oriented leader or the existence of a positive climate. This explanation would need to be tested in subsequent research.

Theoretical and applied implications

The confirmation, for the most part, of the proposed model supports the findings obtained from other studies (Bass et al., 2003; Carron, 1982; Sivasubramaniam et al., 2002; Spink, 1998) into the mediating role played by group processes between leadership and team outcomes. The present study also confirms that this occurs when climate is taken as the measure of group processes, both in terms of global climate and the climate of innovation. However, the potency variable, that is normally considered as a mediating variable (Bass et al., 2003; Guzzo et al., 1993; Lester et al., 2002; Mañas, et al., 1999; Sivasubramaniam et al., 2002) together with other group processes, in the present study appears rather as a moderating variable, given the major differences observed between high and low potency teams.

These findings also have important applied implications. Firstly, given that the actions and strategies implemented by the change-oriented leader are mediated and moderated by other variables, it would be advisable to identify and, where necessary, modify such variables before embarking on such actions, which may at times give rise to considerable resistance. For example, if the influence of leadership on outcomes (in terms of both performance and satisfaction) is explained by climate, it may well be desirable for the leader to refrain from promoting change unless the climate is positive (and particularly in a climate that support the innovation). Where this is not so, it is recommended undertaking prior actions to improve the

different dimensions of the climate (e.g. objectives, participation, task orientation, support to innovation, etc.). Various strategies oriented to these ends exist, such as management by objectives, delegation and empowerment and so on, all of which are widely recognized and actually applied within the organizations, including healthcare institutions. On the other hand, as this study itself shows, the behavior of the change-oriented leader may contribute to foster a positive climate, especially in teams with high group potency. Other studies (González Navarro et al., 1993; González Romá, Ramos, Peiró, Rodríguez & Muñoz, 1995; Mañas, González Romá & Peiró, 1999) have demonstrated that the leader can mould the climate perceptions held by team members through social interactions, which may in itself improve the quality of working life.

Since the influence of leadership on performance is moderated by potency, any attempt by the leader to promote changes in low potency teams (i.e. where members are not confident of their potential) will be an exercise in futility, even where conditions are favorable (positive climate). In such cases, could be recommend any intervention to boost team potency before going ahead with change. This could be achieved, for example, by developing the skills of team members (including the skills necessary to take on new tasks and to work together as a team in a coordinated manner), or by fostering the self-confidence of the team. Training actions might be planned on the one hand and, on the other, activities and tasks could be designed that were, not only attractive and innovative, but also easily carried out by the team, providing a challenge within the range of its potential. To the extent that the team may have the necessary skills to undertake new tasks and has the opportunity to test them appropriately and obtain feedback and reinforcement, it is likely that self-confidence will increase (Guzzo et al., 1993).

Since satisfaction appears strongly associated with climate, it is also essential to improve the dimensions of climate in the manner we have just described. In the case of high potency

teams, where self-confidence is likely to be a major source of satisfaction, we would consider to implement previous interventions centered in strengthening potency.

Limitations and future directions

The present research is subject to certain limitations, which should be considered in future research. First, the sample; despite the relatively large number of individuals involved, the sample shrinks when the analysis is performed at the group level. It would also be of interest to use samples differentiated by service within the healthcare field, and from other sectors. It would also be interesting to fill out this correlative and cross-level study by carrying out experimental and longitudinal research to establish the direction of causality and explore the possible influence of team development over time.

The findings also invite to explore the conditions under which change-oriented leadership, insofar as it represents a strategic issue, will have the greatest impact, analyzing the environment, external relations and so on, as well as the moderating role of leadership between these variables and climate, as proposed by West and Hirst (2003). Similarly, the relationships between other important variables need further examination, as task and objectives interdependence, empowerment and team autonomy, etc. It would likewise be of interest to study their effects on new forms of work organization and on virtual teams.

To conclude, the importance of the leader's role in anticipating change and providing the team with guidance in fluid situations is beyond doubt, but his/her real influence will depend on having the appropriate allies, on a favorable team climate and on the existence of teams that are confident of their own potential. In this context, we may cite the metaphor that West (2002) applies to innovation: teams may be 'sparkling fountains' instead of 'stagnant ponds'.

References

- Alcover, C. M., & Gil, F. (1999). The effects of member change and continuity on the productive efficiency of work teams. *Psychology in Spain*, 3, 88-97.
- Alcover, C. M., & Gil, F. (2000). Potencia en grupos: un constructo entre la autoeficacia y la motivación colectiva [Potency in groups: a construct between self-efficacy and collective motivation]. *Apuntes de Psicología*, 18, 123-143.
- Ancona, D., & Caldwell, D. F. (1992). Bridging the boundary: External activity and performance in organizational teams. *Administrative Science Quarterly*, 37, 634-665.
- Anderson, N. R., & West, M. A. (1994), *The Team Climate Inventory*, Windsor, Berks ASE Press.
- Anderson, N. R., & West, M. A. (1998). Measuring climate for work group innovation: development and validation of the team climate inventory. *Journal of Organizational Behavior*, 19, 235-258.
- Avolio, B. J., Jung, D. I., Murry, W. D., & Sivasubramaniam, N. (1996). Building highly developed teams: Focused on shared leadership process, efficacy, trust and performance. In M. M. Beyerlein, D. A. Johnson, & S. T. Beyerlein (Eds.), *Advances in interdisciplinary studies of work teams* (pp. 173-209). Greenwich: JAI.
- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51, 1173-1182.
- Bass, B. M. (1985). *Leadership and performance beyond expectations*. New York: Free Press.
- Bass, B. M., Avolio, B. J., Jung, D. I., & Berson, Y. (2003). Predicting unit performance by assessing transformational and transactional leadership. *Journal of Applied Psychology*, 88, 207-218.
- Burningham, C., & West, M. A. (1995). Individual, climate, and group interaction processes

- as predictors of work team innovation. *Small Group Research*, 26, 106-117.
- Campion, M. A., Medsker G. J., & Higgs, C. A. (1993). Relations between group characteristics and effectiveness. Implication for designing effective work groups. *Personnel Psychology*, 46, 823-850.
- Campion, M. A., Papper, E. A., & Medsker G. J. (1996). Relations between team characteristics and effectiveness. A replication and extension. *Personnel Psychology*, 49, 429-452.
- Carron, A. V. (1982). Cohesiveness in sport groups: Interpretations and considerations. *Journal of Sport Psychology*, 4, 123-138.
- Chan, D. (1998). Functional relations among constructs in the same content domain at different levels of analysis: a typology of composition models. *Journal of Applied Psychology*, 83, 234-246.
- Conger, J. A., & Kanungo, R. (1988), *Charismatic leadership. The elusive in organizational settings*. San Francisco: Jossey Bass.
- Ekwall, G., & Arvonen, J. (1991). Change-centered leadership: An extension of the two-dimensional model. *Scandinavian Journal of Management*, 7, 17-26.
- Foels, R., Driskell, J. E., Mullen, B., & Salas, E. (2000). The effects of democratic leadership on group member satisfaction: An integration. *Small Group Research*, 31, 676-701.
- Gil, F., & Alcover, C. M. (2002). Work teams as complex social systems: Temporal factors, sociocognitive processes and work team empowerment as basis of group dynamics at work. 13th General Meeting European Association of Experimental Social Psychology.
- Gil, F., Ares, A., & Barrasa, A. (2003). Dirección y liderazgo organizacional: gestión y cambio [Management and organizational leadership: management and change], *Encuentros en Psicología Social*, 1, 95- 100.
- Gladstein, D. (1984). Groups in context: A model of task group effectiveness. *Administrative*

Science Quarterly, 29, 499-517.

- González-Navarro, P., Bravo, M. J., González-Romá, V., Zurriaga, R., & Peiró, J. M. (1993). Liderazgo y percepciones de clima [Leadership and perception of climate]. In L. Munduate, & M. Barón (Eds.), *Psicología del Trabajo y de las Organizaciones* (pp. 75-85). Sevilla: Eudema.
- González-Romá, V., Ramos, J., Peiró, J. M., Rodríguez, I., & Muñoz, P. (1995). Formación del clima de los equipos de trabajo e interacción social [Formation of work team climate and social interaction]. In Zurriaga, R., & Sancerni, M.D. (Eds.), *Experiencias laborales en organizaciones de trabajo* (pp. 65-78). Valencia: Nau Llibres.
- Gully, S. M., Joshi, A., Incalcaterra, K. A., & Beaubien, J. M. (2002). A meta-Analysis of Team-Efficacy, Potency and Performance: Interdependence and level of Analysis as Moderators of observed relationships. *Journal of Applied Psychology*, 87, 819-832.
- Guzzo, R. A., & Dickson, M. W. (1996). Teams in organizations: Recent research on performance and effectiveness. *Annual Review of Psychology*, 47, 307-338.
- Guzzo, R. A., Yost, P. R., Campbell, R. J., & Shea, G. P. (1993). Potency in groups: Articulating a construct. *British Journal of Social Psychology*, 3, 87-106.
- Heinemann, G. D., & Zeiss, A. M. (2002). *Team Performance in Health Care. Assessment and Development*. New York: Kluwer Academic.
- House, R. J. (1977). A 1976 theory of charismatic leadership. In J. G. Hunt, & L. L. Larson, (Eds.), *Leadership: The cutting edge* (pp. 189-207). Carbondale: Southern Illinois University Press.
- Jordan, M. H., Feild, H. S., & Armenakis, A. A. (2002). The relationship of group process variables and team performance: A team-level analysis in a field setting. *Small Group Research*, 33, 121-150.
- Kahai, S. S., & Sosik, J. J. (1998). Computer-supported work group potency and

effectiveness: the role of transformational leadership, anonymity, and task interdependence. *Computers in Human Behavior*, 14, 491-511.

Katzenbach, J. R. (1997). *Teams at top: Unleashing the potential of both teams and individual leader*. Harvard: Business School Press.

Kenny, D.A., & La Voie, L. (1985). Separating individual and group effects. *Journal of Personality and Social Psychology*, 48, 339-348.

Kotter, J. P. (1990), *A force for change*. New York: Free Press.

Kozlowski, S. W., & Doherty, M. L. (1989). Integration of Climate and Leadership: Examination of a neglected issue. *Journal of Applied Psychology*, 74, 546-553.

Kozlowski, S. W., Gully, S. M., Salas, E., & Cannon-Bowers, J. A. (1996). Team leadership and development: Theories, principles, and guidelines for training leaders and teams. In M. M. Beyerlein, D. A. Johnson, & S. T. Beyerlein (Eds.), *Advances in interdisciplinary studies of work teams* (pp. 253-291). Greenwich: JAI.

Lester, S. W., Meglino, B. M., & Korsgaard, M. A. (2002). The antecedents and consequences of group potency: A longitudinal investigation of newly formed work groups. *Academy of Management Journal*, 45, 352-368.

Lewin, K., Lippitt, R., & White, R. K. (1939). Patterns of aggressive behavior in experimentally created climates. *Journal of Social Psychology*, 10, 271-299.

Litwin, G.H., & Stringer, R.A. (1968), *Motivation and organizational climate*. Boston: Harvard University.

Lowe, K. B., Kroeck, K. G., & Sivasubramaniam, N. (1996). Effectiveness correlates of transformational and transactional leadership: A meta-analytic review of the MLQ literature. *Leadership Quarterly*, 7, 385-425.

Mañas, M. A., Gonzalez Romá, V., & Peiró, J. M. (1999), *El clima de los equipos de trabajo: determinantes y consecuencias* [Work team climate: Determinants and consequences].

Almería: Universidad de Almería.

- Mohrman, S., Cohen, S., & Mohrman, A. (1995). *Designing team-based organizations*. San Francisco: Jossey-Bass.
- Pearce, C. L., Gallagher, C. A., & Ensley, M. D. (2002). Confidence at the group level of analysis: a longitudinal investigation of the relationship between potency and team effectiveness. *Journal of Occupational and Organizational Psychology*, 75, 115-119.
- Poole, M. S., & Real, K. (2003). Groups and teams in health care: Communication and effectiveness. In T. L. Thompson, A. M. Dorsey, K. Miller, & R. Parrott (Eds), *Handbook of health communication* (pp. 369-402). Mahwah: Lawrence Erlbaum.
- Salas, E., Stagl, K. C., & Burke, C. S. (2004). 25 years of team effectiveness in organizations: Research themes and emerging needs. In C. L. Cooper, & I. T. Robertson (Eds.), *International Review of Industrial and Organizational Psychology, Vol. 19* (pp. 47-91). Chichester: John Wiley & Sons.
- Shamir, B. (1999). Leadership in boundaryless organizations: Disposable or indispensable? *European Journal of Work and Organizational Psychology*, 8, 49-71.
- Shamir, B., House, R. J., & Arthur, M. B. (1993). The motivational effects of charismatic leadership: A self-concept based theory. *Organizational Science*, 4, 577-594.
- Sivasubramaniam, N., Murry, W. D., Avolio, B. J., & Jung, D. I. (2002). A longitudinal model of the effects of team leadership and group potency on group performance. *Group and Organization Management*, 27, 66-96.
- Sobel, M. E. (1982). Asymptotic confidence intervals for indirect effects in structural equation models. In S. Leinhardt (Ed.), *Sociological Methodology* (pp. 290-312). San Francisco: Jossey Bass.
- Sosik, J. J., Avolio, B. J., & Kahai, S. S. (1997). Effects of Leadership Style and Anonymity on Group Potency and Effectiveness in a Group Decision Support System. *Environment*

Journal of Applied Psychology. 82, 89-103.

Sosik, J. J., Avolio, B. J., Kahai, S. S., & Jung, D. I. (1998). Computer-supported work group potency and effectiveness: The role of transformational leadership, anonymity, and task interdependence. *Computers in Human Behavior*, 14, 491-511.

Spink, K. S. (1998). Mediation effects of social cohesion on the leadership behavior intention to return relationship in sport. *Group Dynamics*, 2, 92-100.

Stewart, G. L., & Barrick, M. R. (2000). Team structure and performance: Assessing the mediating role of intrateam process and the moderating role of task type. *Academy of Management Journal*, 43, 135-148.

Tushman, M. L., & Romanelli, E. (1985). Organization evolution: A metamorphosis model of convergence and reorientation. In L. L. Cummings, & B. M. Staw (Eds.), *Research in Organizational Behavior*, Vol. 7 (pp. 171-222). Greenwich: JAI Press.

West, M. A. (2002). Sparkling fountains or stagnant ponds: an integrative model of creativity and innovation implementation in work groups. *Applied Psychology: An International Review*, 51, 355-424.

West, M. A., & Hirst, G. (2003). Cooperation and teamwork for innovation. In M. A. West, D. Tjosvold, & K. G. Smith (Eds.), *International Handbook of Organizational Teamwork and Cooperative Working* (pp. 297-319). Chichester: John Wiley.

Yukl, G. (1998). An evaluative essay on current conceptions of effective leadership. *European Journal of Work and Organizational Psychology*, 8, 33-48.

Yukl, G. (2002). *Leadership in organizations*. Upper Saddle River: Prentice-Hall.

Yukl, G. (2004). Tridimensional Leadership theory: A roadmap for flexible, adaptive leaders. In R. J. Burke, & C. Cooper (Eds.), *Leading in turbulent times* (pp. 75-91). Oxford: Blackwell.

Yukl, G., Gordon, A., & Taber, T. (2002). A hierarchical taxonomy of leadership behavior:

Integrating a half century of behavior research. *Journal of Leadership and Organizational Studies*, 9, 15-32.

ARTICLE 4

The role of team climate for innovation in different types of teamwork: A multigroup analysis of organizational context influences on team satisfaction and performance

Abstract

This study tested the predictions of the team climate for innovation model in explaining satisfaction and performance at group level. Organizational context specific data ($N= 239$ teams, 1099 individuals, from hospitals, public administration, and software company) were analyzed via multigroup structural equation modelling. Results provided evidence supporting the proposed model, comparisons showed that the obtained associations were similar for the three different types of teamwork with invariance of factor loadings and factor variances. There were many organizational context differences in the model, mainly concerning error variances in latent variables, team climate means, and explained variance for team satisfaction and performance in different teams.

Environment level factors such as group task characteristics, reward structure, or level of environmental stress have been recognized as key inputs both at the first models of group processes (i.e. Hackman & Morris, 1975) or at the more recent ones which focus not only on team effectiveness issues but also on team viability (Ilgen, Hollenbeck, Johnson, & Jundt, 2005).

Many researchers point to the importance of organizational context for effective teamwork in order to find adequate ways of promoting cooperative working and interdependence (Guzzo & Shea, 1992; Hackman, 1990). The structure and functioning of the organization should support rather than undermine teamwork.

Team climate for innovation

A multifactorial model for innovation in workgroups by West (1990) suggests four factors including participative safety, support for innovation, objectives and vision, and task orientation.

Participation in decision making is suggested to be important in innovative performance because it may increase the likelihood that the members of the group invest in the outcomes of the decisions and that they are willing to offer new ideas to the group (participation and participative safety). Approval and practical support for innovation attempts to introduce new and improved ways of doing things in the work environment will facilitate team innovation (support for innovation). Groups with clearly defined shared objectives and visions are more likely to develop new useful working methods since their efforts have focus and direction (objectives and vision). Innovative performance may also require the commitment of the group to achieve the highest possible standards of task performance in relation to shared vision or outcomes, characterized by evaluations, modifications, control systems and critical appraisals, which supports the adoption of improvements to established policies, procedures, and methods (task orientation and climate for excellence).

Organizational contexts

There are differences in team climate for innovation caused by the organizational context. Context influences on type of teamwork, for example Dackert, Brenner, and Johansson (2002)

using 89 employees from 4 teams found differences in team climate scores (participation and support for innovation) for stable and merged/unstable organization, higher levels of team climate were found for stable ones. But other times, studies don't find variation: using a sample of 20 research and 18 development teams in the same organization any difference was found for the different types of teams (Bain, Mann, & Pirola-Merlo, 2001).

The organizational sector has also an important role in order to develop one type of teamwork or another. West and Poulton (1997) compared team climate scores on primary health care teams with oil company, management, community mental health, and social service teams. Primary health care teams scored significantly lower than other teams on team participation, support for innovation, and vision. Williams and Laungani (1999) using a sample of 259 members from hospitals (primary health-care, multidisciplinary, single-disciplinary, and management teams). They reported that scale scores on team climate distinguished primary health care teams from three other types of health care teams for two of the four factors: primary health-care teams scored significantly lower than multidisciplinary teams in participation and vision. Ragazzoni, Baiardi, Zotti, Anderson, and West (2002) used a sample of 585 participants (199 in health-care and 386 in bank companies). They don't find differences for team climate scores in different organizational contexts (health-care and bank organizations). Curral, Forrester, Dawson, and West (2001) using a sample of 398 members from 87 teams (16 organizations from different sectors). They reported that scale scores on team climate distinguished between organizational sectors (advertising, pharmaceuticals, health, and miscellaneous). Teams in the advertising industry had significantly higher scores in participative and task orientation than miscellaneous sector (banking, manufacturing, information technology, and research), as well as significantly higher scores in task orientation than teams in health care sector.

Team effectiveness: Satisfaction and performance

Although team climate for innovation was originally operationalized and developed as a facet-specific measure of climate, it is likely in addition to be useful in measuring climate dimensions predictive of other types of group output (Anderson & West, 1998).

Relations between climate and dependent variables as job satisfaction and performance have long tradition in research (Friedlander & Margulies, 1969; Pritchard & Karasek, 1973), but they used just the organizational level both of climate and outputs (organizational satisfaction and performance).

Regarding satisfaction, results from structural equation modeling (SEM) analyses showed that climate variables contributed directly to job satisfaction and work effort (Yoon, Beatty, & Suh, 2001). Sometimes previous research have analyzed climate input variables at team level: Peiró, González-Romá, and Ramos (1992) showed relationships between work team climate and job satisfaction, or poor team climate was associated with high stress (Lämsäsalmi & Kivimäki, 1999), but it would be useful consider satisfaction too at team level (Mason & Griffin, 2002, 2005).

Regarding performance, it has been proposed that climate can be used to predict organizational performance (Pritchard & Karasek, 1973). Teams characterized by clear objectives, a high concern for task performance, and a participative atmosphere are likely to perform better overall than teams that are weak on these factors (Anderson & West, 1998).

Theorists and researchers examining the relationships between climate and effectiveness, such as Pritchard and Karasek (1973) or Denison (1990), suggest that when employees perceive their organizational environment (e.g., work team) positively (as consistent with their own values and interests), where staff feel a greater involvement in decision making, where there is a commitment to information sharing and communication, and where there is a sense of shared vision and

support, then these will lead to greater effectiveness because they are likely to identify their personal goals with those of the organization and to put greater effort into pursuing them.

Equivalent structural equation models

The literature on equivalent models has dealt exclusively with the single-group case. Their study in the multiple-group context contributes to a better understanding of the equivalence phenomenon and suggests a possible approach to partial managing of the problem in multiple-population settings (Raykov, 1997).

The aims of the paper are threefold: to test the influence model of team climate for innovation on team satisfaction and performance at group level, to evaluate the amount of this influence in different teamwork organizational contexts, and finally to compare differences of types of teamwork in the model by multigroup analysis.

Method

Samples

All teams worked together on a daily basis. The teams in the three samples had overall responsibility for the activities within a defined segment and level of the organization and the team members discussed, planned and made decisions with respect to these activities. All team members were working together for at least the previous year. Teams that didn't provide at least four respondents were rejected.

Sample 1. Hospitals. 89 health-care teams

We included health-care teams from hospitals throughout Spain. Finally 89 teams were included in the study. Team size averaged 12.6 members ($SD=7.9$), team tenure was 9.31

years ($SD=4.97$), and the total number of respondents was 406. The average age of the team members was 40.8 years ($SD=7.9$), of them 60.8% were women. All teams consisted of a homogeneous sample: all came from public hospitals, had health-care tasks, and were responsible for their section in the organization. The sample was heterogeneous in that the teams represented different hospital areas (cardiology, digestive, oncology, orthopaedic surgery, psychiatry, respiratory, surgery, and urgencies).

Sample 2. Public administration. 20 managerial teams

20 managerial teams from different public administration in Spain were included in the study. Team size averaged 11.8 members ($SD=10.48$), team tenure was 8.23 years ($SD=5.55$), and the total number of respondents was 209. The average age of the team members was 40.0 years ($SD=9.5$), of them 54.1% were women. All teams consisted of a homogeneous sample: all came from civil service, had management tasks, and were responsible for their section in the organization. The sample was heterogeneous in that the teams represented different public administrations (universities, secondary schools, libraries, treasury offices, courts, local and regional governments).

Sample 3. Software company. 130 virtual teams

We included 130 project teams from a multinational software company throughout Spain, Mexico, USA, and Brazil. Team size averaged 10.6 members ($SD=9.1$), team tenure was 2.72 years ($SD=1.60$), and the total number of respondents was 484. The average age of the team members was 29.9 years ($SD=5.7$), of them 30.4% were women. All teams consisted of a homogeneous sample: all came from the same organization, at least two of the team members work geographically dispersed, they used telecommunication technology media in a frequent basis, had software development tasks, and were responsible for their project. The sample was heterogeneous in that different teams work with different technologies and for different regular customer organizations from energy, telecommunications and food sectors.

Measures

Team Climate Inventory (TCI)

The original and Spanish version of the TCI (Anderson & West, 1994) was used. The questionnaire consists of 38 items related to four basic group dimensions, namely (1) participation and participation safety, (2) support for innovation, (3) objectives and vision and (4) task orientation and climate for excellence. Items describe group characteristics and the respondent is asked to indicate to what degree he or she agrees or disagrees on five-point scales (where 1 is ‘Strongly disagree’ and 5 is ‘Strongly agree’).

Several TCI adaptations were carried out in European samples, obtaining adequate psychometric properties (i.e. Anderson & West, 1998; Barrasa, West, & Gil, submitted).

Adequate levels of reliability were found for overall scale and subscales both at individual and team level (range 0.80-0.98, see Table 2). The questionnaire was filled out by all team members individually and is scored separately for each dimension by summing the marked figures and dividing by the number of items.

In order to aggregate data at team level we tested the intragroup team climate homogeneity. We found adequate levels for overall scale and subscales for different indexes: $r_{wg(J)}$ averaged 0.83, ICC(1) ranged from 0.28 to 0.35, and $AD_{M(J)}$ median of 0.47, according to cutoff criteria over 0.70 for $r_{wg(J)}$ (James, Damaree, & Wolf, 1993; Naumann & Bennet, 2000;), over 0.25 for ICC(1) (Kenny & LaVoie, 1985), and under 0.85 for $AD_{M(J)}$ with five categories and number of respondents averaged 4.59 (Dunlap, Burke, & Smith-Crowe, 2003).

Team members' satisfaction.

Team satisfaction was assessed using Gladstein's (1984) scale of five items (alpha range 0.74-0.77), which indicate the degree to which subjects display satisfaction with being a team member, satisfaction with their colleagues, the manner of team working, with the team as a

whole, with the job, the compensation system, the method of evaluation, advancement, and workload, as well satisfaction with dealing with the customer and meeting customer needs. Responses were scored using a five-point Likert scale (1= disagree completely, 6 = completely agree). Reliability found ranged 0.79-0.84, see Table 2). Indexes of team satisfaction homogeneity in order to aggregate measures at team level were adequate: $r_{wg(J)}$ averaged 0.87, ICC(1) ranged from 0.32 to 0.41, and $AD_{M(J)}$ median of 0.38.

Team performance

Each team's performance was also rated by at least three independent experts who knew the evaluated team well, but were outside of the team, e.g. supervisors, leaders, and managers, using Ancona and Caldwell (1992) questionnaire. It is composed by 5 items, rating each team's efficiency, quality of technical innovations, adherence to schedules, adherence to budgets, and ability to resolve conflicts using 5-point Likert scale (where 1 is 'Completely disagree' and 5 is 'Completely agree'). Agreement inter-judges indexes founded were reasonably satisfactory ranged 0.58-0.80. The questionnaire has showed adequate psychometric properties with internal consistency index Cronbach's alpha $\alpha = 0.76$ (see Table 2 for different samples).

Procedure

TCI and group task satisfaction measure was handed out to the different organizations' human resources departments, who contacted all team members. Team members were asked to participate in the research by completing the questionnaire individually and remaining anonymous. Each team member completed the questionnaire alone and returned it to the contact person within the human resource department, who returned them to the investigators. The Team Performance Questionnaire was filled out by at least three independent expert persons in formal positions: leaders, supervisors and managers in the organization. They had a

good knowledge of the team's performance in terms of efficiency, quality of technical innovations, adherence to schedules, and ability to resolve conflicts. These persons were external, but knowledgeable of the group and in a superior position. Their responses were put into a sealed envelope and delivered to the investigators.

After data analysis, each group received feedback with respect to how their team had rated itself compared with the average of all participating teams.

Analyses

Descriptive data analyses were carried out both at individual and team level. Pearson product-moment correlations were used to examine the interrelationships between variables. Organizational context differences in the means of the study variables were analyzed by using the *t*-test for independent samples of teams.

Structural equation modeling (SEM) analysis was used to investigate at team level the hypothesized relationships between the study variables. The method of estimation was maximum likelihood (ML), and estimates derived from covariance matrices produced were calculated separately for hospitals, public administration, and software company (Jöreskog, Sörbom, du Toit, & du Toit, 2000).

Multiple indexes of fit were examined to evaluate how well the estimated model described the input data set: χ^2 statistic; the non-normed fit index or Tucker-Lewis index (NNFI or TLI), the comparative fit index (CFI), the goodness-of-fit index (GFI), root mean square residual (RMSR), and the root mean square error of approximation (RMSEA). The χ^2 statistic assesses discrepancy between the estimated model-implied population covariance matrix and the sample data covariance matrix. Its significance is affected by sample size and non-significant test statistics with large samples are unlikely but we do consider the size of the change in χ^2 when comparing nested models, and usually χ^2/df values under 2.00 are considered acceptable

(Bollen, 1989; Jöreskog et al., 2000). The NNFI is an incremental fit index that tests the relative improvement of fit by comparing the target model to a more conservative baseline model with no correlations among observed variables (Bentler & Bonnett, 1980). The CFI assesses the lack of fit as estimated by the non-central χ^2 distribution of a target model compared to a baseline model. GFI is an index of absolute fit, that is, the relative amount of the observed variances and covariances accounted for by the hypothesised model. For these fit indexes, values greater than 0.90 and 0.95 are taken to reflect acceptable and excellent fit to the data respectively (Hu & Bentler, 1999). The RMSR is the square root of the mean of the squared discrepancies between the implied and the observed covariance matrices. The RMSEA is also based on the analysis of residuals and compensates for the effects of model complexity. For these indexes, values of less than 0.05 and 0.08 are taken to indicate a close fit and a reasonable fit, respectively, to the data (Hu & Bentler, 1999).

The organizational context teamwork equality in the association between the variables was assessed with multigroup structural equations modeling analysis. Data were analyzed through multigroup (hospitals, public administration, software company), and factor structures were tested simultaneously in the three samples.

First, a preliminary model is developed where the three groups have parallel structures but where the parameters –factor coefficients, paths, disturbances, correlations, and so forth- are estimated independently (Bollen, 1989). In essence, the same structure is fitted to the three different sets of data, but the values of fitted parameters are not equated across groups. In subsequent steps, successive sets of parameters are constrained to invariance or equality across all groups (factor loadings, error variances, factor variances). Each model is assessed relative to the previous one to ascertain if model fit has worsened with the imposition of the new constraints. In order to evaluate it, we used the $\Delta\chi^2$ and the change in CFI for the new

model. We consider the new model invariant, and then equality of this model across groups if $\Delta\chi^2$ is not significant and the decrease in CFI is 0.01 or less (Cheung & Rensvold, 2002).

Results

Descriptive statistics

The means, standard deviations among the study variables for the different organizational contexts at individual and team level are shown in Table 1. Inspection of the team climate variables for the four subscales shows higher means for software company teams compared to teams from hospitals and public administration. Univariate skewness and kurtosis values indicate that the observed variables in the three samples were approximately normal (no marked deviations from normality were found in an initial data exploration step).

Table 1

Univariate descriptive statistics. Hospitals, public administration, software company organizational contexts, and pooled samples means and standard deviations at individual and team level

Variables	Hospitals		Public administration		Software company		Pooled	
	M	SD	M	SD	M	SD	M	SD
Individual level	n=406		n=209		n=484		n=1099	
Participation	3.45	0.84	3.95	0.59	3.90	0.78	3.75	0.81
Support for innovation	3.20	0.88	3.49	0.82	3.72	0.79	3.48	0.86
Vision	3.45	0.76	3.83	0.56	3.89	0.69	3.72	0.72
Task orientation	3.17	0.90	3.77	0.73	3.52	0.90	3.44	0.90
Team climate overall	3.35	0.74	3.78	0.55	3.78	0.65	3.62	0.70
Satisfaction	3.72	0.93	3.83	0.91	4.17	0.85	3.94	0.92
Team level	n=89		n=20		n=130		n=239	
Participation	3.45	0.69	3.72	0.63	3.97	0.66	3.75	0.70
Support for innovation	3.20	0.73	3.24	0.85	3.75	0.64	3.50	0.74
Vision	3.43	0.61	3.63	0.61	3.94	0.45	3.72	0.58
Task orientation	3.11	0.73	3.37	0.77	3.61	0.66	3.40	0.73
Team climate overall	3.33	0.63	3.53	0.55	3.84	0.48	3.62	0.59
Satisfaction	3.70	0.80	3.43	0.89	4.23	0.64	3.96	0.78
Team performance	3.82	0.64	4.23	0.40	3.21	1.19	3.56	1.00

t-Tests

There were organizational context differences in the mean levels of two variables. Twelve *t*-tests compared the organizational context mean scores at team level on the four team climate variables, team member's satisfaction, and team performance.

On team climate measures there weren't differences between hospitals and public administration teams; there were some differences between public administration and software company teams, software company teams showed higher levels of team climate, in support for innovation $t(147) = 3.13, p < 0.05$, and in vision $t(147) = 2.75, p < 0.05$; and notable differences between hospitals and software company teams too in support for innovation $t(216) = 5.87, p < 0.05$, in vision $t(216) = 7.16, p < 0.01$, task orientation $t(216) = 5.23, p < 0.10$, and overall team climate $t(216) = 6.81, p < 0.01$, always software company teams showing higher levels of team climate.

On team members' satisfaction there was not difference between hospitals and public administrations teams; but there was difference between public administration and software company $t(147) = 4.89, p < 0.01$, and between hospitals and software company $t(216) = 5.44, p < 0.01$, showing software company teams higher scores on satisfaction in both cases.

On team performance, the opposite differences structure was found with higher levels of team performance in the public administration and hospital teams: no difference between hospitals and public administration contexts, but significant differences between public administration and software company $t(147) = 3.76, p < 0.01$, and between hospitals and software company $t(216) = 3.99, p < 0.01$.

Intercorrelations

Correlations among the study variables for different organizational contexts at individual and team level are shown in Table 2. Team climate variables correlated statistically significantly with team member's satisfaction and team performance among hospitals, public administration, and software company, both at individual and team level of analysis.

Table 2

Hospitals, public administration, software company, and pooled samples correlations for the variables in the study

Individual level	Hospitals						Public administration						Software company						Pooled						
Variables	n=406						n=209						n=484						n=1099						
	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	
1. Participation	0.940						0.861						0.945						0.933						
2. Support for innovation	0.856**	0.936					0.684**	0.893					0.804**	0.936					0.811**	0.927					
3. Vision	0.664**	0.644**	0.934				0.407**	0.650**	0.805			0.518**	0.489**	0.909			0.601**	0.608**	0.909						
4. Task orientation	0.759**	0.775**	0.708**	0.928			0.768**	0.621**	0.448**	0.827			0.609**	0.608**	0.555**	0.905			0.708**	0.678**	0.622**	0.909			
5. Team climate overall	0.930**	0.912**	0.843**	0.890**	0.975		0.863**	0.891**	0.749**	0.834**	0.938		0.886**	0.859**	0.774**	0.819**	0.966		0.910**	0.888**	0.818**	0.853**	0.967		
6. Satisfaction	0.791**	0.756**	0.652**	0.749**	0.825**	0.842	0.787**	0.630**	0.419**	0.636**	0.745**	0.808	0.723**	0.700**	0.494**	0.595**	0.751**	0.796	0.754**	0.724**	0.566**	0.651**	0.778**	0.824	

Team level	Hospitals							Public administration							Software company							Pooled						
Variables	n=89							n=20							n=130							n=239						
	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
1. Participation	0.967							0.887							0.887							0.957						
2. Support for innovation	0.889**	0.961						0.652**	0.936						0.831**	0.936						0.851**	0.959					
3. Vision	0.716**	0.737**	0.961					0.221	0.553*	0.851			0.438**	0.507**	0.851			0.604**	0.670**	0.943								
4. Task orientation	0.852**	0.847**	0.756**	0.955			0.734**	0.583**	0.318	0.859			0.493**	0.475**	0.434**	0.859			0.696**	0.677**	0.621**	0.937						
5. Team climate overall	0.946**	0.941**	0.870**	0.927**	0.985		0.828**	0.883**	0.659**	0.809**	0.942		0.881**	0.880**	0.718**	0.734**	0.942		0.912**	0.915**	0.824**	0.844**	0.979					
6. Satisfaction	0.833**	0.833**	0.729**	0.837**	0.875**	0.912		0.779**	0.542*	0.238	0.483*	0.654**	0.806	0.734**	0.703**	0.493**	0.470**	0.755**	0.806	0.786**	0.769**	0.626**	0.655**	0.815**	0.879			
7. Team performance	0.458**	0.461**	0.381**	0.484**	0.483**	0.568**	0.804	0.239	0.548*	0.477*	0.201	0.467*	0.411	0.587	0.605**	0.553**	0.486**	0.554**	0.636**	0.713**	0.672	0.318**	0.245**	0.209**	0.296**	0.302**	0.327**	0.761

*Note: * $p < 0.05$, ** $p < 0.01$. Internal consistencies for the scales in the study at the diagonal*

Structural equation modeling

In order to use structural equation modeling to investigate the hypothesized associations between the study variables, a latent variables approach offers potential advantages in SEM analysis as it enables measurement error to be taken into account (Bollen, 1989). Typically, multiple items or measures are used to assess each latent variable (i.e., measurement model). In the present application, however, this approach would have resulted in an unacceptably high ratio of estimated parameters compared to sample size (especially using team level of analysis) and, thus, was not feasible (e.g., Participation included 14 observed variables). Therefore, an alternative procedure was chosen: the four composite variables of the subconstructs of team climate (i.e. participation, task orientation, support for innovation, and vision) were used as observed variables in the estimation of the latent team climate variable. The hospitals, public administration, and software company models, along with the common metric standardized weights, are presented in Figure 1.

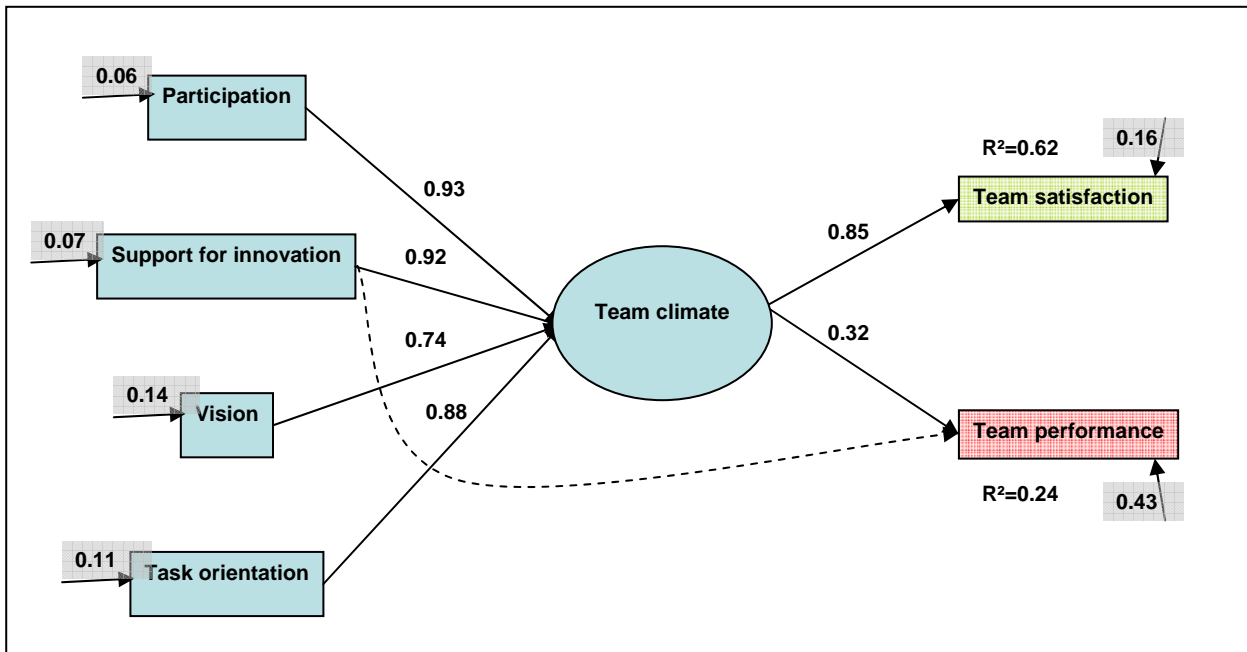


Figure 1. Hospitals, public administration, and software company teams maximum-likelihood structural equations models with common metric standardized parameter estimates. Broken lines indicate organizational context differences, that is, paths that were significant either only in one of the group samples. All other paths were significant beyond the 0.05 level.

As seen in Table 1, some organizational context differences in the associations between variables occurred. The previous team climate literature also shows some context differences in hypothesized associations.

Pooled data analysis

The data from the three organizational contexts were pooled to eliminate the different type of teamwork effect on the structural equation model

The results in Table 3 of fitting several three-group variants of either model using the maximum-likelihood method indicate a moderate fit of the measurement model to the pooled

data ($\chi^2 = 19.46$, $df = 10$, $\chi^2/df = 1.94$, $p = 0.034$, NNFI = 0.99, CFI = 0.99, GFI = 0.97, RMSR = 0.018, RMSEA = 0.071). Factor loadings were all above 0.74 (except for team performance, 0.32) and error variances less than 0.43 (see Table 4). All loadings were statistically significant ($p < 0.05$), confirming the cross-contextual applicability of the model.

Table 3

Results of the pooled sample and single-group structural equations analysis across samples

Model	χ^2	df	χ^2/df	NNFI	CFI	GFI	RMSR	RMSEA
Pooled	19.46	10	1.94*	0.99	0.99	0.97	0.018	0.071
Hospitals	15.69	10	1.56	0.99	0.99	0.93	0.022	0.087
Public administration	19.44	10	1.94*	0.79	0.83	0.75	0.061	0.123
Software company	31.70	10	3.17***	0.94	0.96	0.90	0.021	0.093

Note: NNFI, non-normed fit index; CFI, comparative fit index; GFI, goodness-of-fit index; RMSR, root mean squared residuals; RMSEA, root mean square error of approximation.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 4

Standardized factor loadings and error variances for the measurement model across samples

Variables	Pooled		Hospitals		Public administration		Software company	
	Path coefficients	Error variance	Factor loading	Error variance	Factor loading	Error variance	Factor loading	Error variance
Participation	0.93	0.06	0.95	0.04	0.95	0.04	0.89	0.06
Support for innovation	0.92	0.07	0.94	0.06	0.72	0.35	0.90	0.05
Vision	0.74	0.14	0.77	0.14	0.32	0.33	0.66	0.10
Task orientation	0.88	0.11	0.92	0.08	0.76	0.25	0.82	0.09
Satisfaction	0.85	0.16	0.88	0.13	0.74	0.31	0.86	0.08
Team performance	0.32	0.43	0.51	0.30	0.33	0.14	0.69	0.54

Single-group analysis

The results of the single-group analysis are shown in Table 3. Overall, the data fit reasonably well to the hypothesised model. All fit statistics were above 0.75. All but one of the error indexes were below 0.10. In addition, the results show a similar pattern across the three organizational contexts. All the factor loadings were statistically significant at the 0.05 level and moderate in size (standardized loadings ranged from 0.33 to 0.95 and error variances ranged from 0.04 to 0.54 for the three groups). The first-order factor loadings and error variances are shown in Table 4.

Team climate scales as well measures of team members' satisfaction and team performance were internally both at individual and team level of analysis (see Table 2 at the diagonal). In sum, the single-group analysis showed that the data from the three samples fit the measurement model adequately. In addition, the psychometric properties in terms of

dimensionality and internal consistency show a similar pattern across the three organizational contexts.

Differences in path

The strongest direct influence from team climate on team output for the three types of teamwork was to team satisfaction ($\beta = 0.88$, $\beta = 0.74$, and $\beta = 0.86$, respectively for hospitals, public administration, and software company teams).

Although the final model, presented graphically in Figure 1, shows that team climate was directly linked to team performance ($\beta = 0.32$), there are important differences between public administration teamwork ($\beta = 0.33$), hospitals ($\beta = 0.51$), and software company ($\beta = 0.69$) showing diverse associations with a high team performance.

Differences in explained variance R^2

In the same direction, the percentages of explained variance were similar across organizational context for team satisfaction: hospitals (78%), public administration (64%), and software company (73%), but the squared multiple correlation (R^2) for team performance was just 11% for public administration, 26% for hospitals, and 48% for the software company, indicating that the proportion of the variance of team performance explained by the antecedents related to team climate could be different.

Multigroup structural equations model analysis

We used a multigroup method of structural equation model to examine the teamwork organizational context equality in the path coefficient model across samples.

To determine the invariance of the structural equations model across the three organizational contexts, four tests were conducted. First, a multigroup analysis was carried out with no

equality constraints across samples. Second, the factor loading invariance was tested with equality constraints imposed on the coefficients linking the observed and latent variables. Third, the invariance of the observed variables with equality constraints imposed on the error variance. And finally, the invariance of the latent variable by the factor variance structure was tested. Table 5 presents the results of the cross-validation procedures.

Table 5

Results of the multigroup structural equation model across samples

Model	χ^2	df	$\Delta\chi^2$	CFI	RMSEA
M1 Free Model	66.83	30	-	0.97	0.140
M2 Equality of factor loading	85.27	38	18.44*	0.95	0.145
M3 Equality of factor loading, error variances	257.07	50	171.80**	0.87	0.258
M4 Equality of factor loading, error variances, and factor variances	261.59	52	4.52	0.87	0.254

Note: CFI, comparative fit index; RMSEA, root mean square error of approximation.

* $p < 0.05$, ** $p < 0.01$.

The results of the first model (M1) show that the model fits the observed data reasonably well. This means that the measurement model based on the hospital context can be replicated with the public administration and software company contexts.

The direct three-group extensions impose no cross-group constraints, are equivalent, and associated with the same goodness-of-fit indexes.

The next model (M2) tested the invariance of the metric with constraints imposed on the factor loading in the model to be equal between organizational contexts. In order to evaluate it, we used $\Delta\chi^2$ and decrease in CFI for the new model (Cheung & Rensvold, 2002). The

change in the new model is in the border: the increase in χ^2 is significant just at a $p = 0.05$ level of signification, but not with more restrictive levels, and the decrease in CFI is just of 0.02 when the limit is at 0.01 (Cheung & Rensvold, 2002). The modification indexes showed then that there was practically the same structure of the estimated paths in the model, so we could consider that the equality of factor loading model (M2) is almost invariant across different groups. However, we also investigated the specific paths that might differ across organizational context since the previous data suggests some minor differences. We identified unexpected but significant path yielded by the model on the basis of the modification indexes. The results of these analyses showed a significant decrease in χ^2 of 12.5 for the software company group when we added the relationship between team climate latent variable of support for innovation and team performance; this improvement in the model fit doesn't work for hospitals or public administration teamwork.

The third model (M3) imposed the cross-group equality restriction also on the error variances to equivalent latent variables. The fit of this new model was certainly worse than the previous one, using both $\Delta\chi^2$ and CFI (see Table 5), suggesting clear differences in the model between different types of teamwork.

Finally the last model (M4) evaluates multigroup equality adding then the group identity restriction on the factor variances, that is, on the latent variable of team climate. Modification indexes showed that with this new constraint not only the loss in fit is not significant but even when equality constraints were imposed on the factor variances it improve the model a bit (see Table 5). Team climate variances structure showed no differences across groups in this model.

Overall, the results indicate that the SEM model has comparability across the three samples in terms of factor loading structure and team climate variances. However, there are differences in the latent variables variances structure, and the relationship between team climate latent variables (especially support for innovation) and team outputs (team performance) appears to be different in hospitals and public administration with regard to software company teamwork.

Discussion

The results of the present study indicate that although the team climate for innovation influence model on team satisfaction and performance has an invariant factor form and structure, as well as cross-contextual applicability, the mean values of the latent constructs differ between the three types of teamwork.

The proposed model has showed a moderate fit of the measurement model to the pooled data for all the different types of teamwork together. Demonstrating at team level the influence of team climate for innovation on satisfaction and performance in similar conditions as previously it have been illustrated at individual level (Firedlander & Margulies, 1969; Pritchard & Karasek, 1973; Yoon, Beatty, & Suh, 2001).

Differences in this model for diverse types of teamwork display higher levels of team climate for innovation in industrial sectors (software company) in comparison with health-care / public sectors, in the same direction as previous research (i.e. Curral et al., 2001).

Although team climate for innovation influence model fit reasonably well for the three different types of teamwork, these results provide evidence that organizational and teamwork differences exist between the three groups of teams. These differences affect scores on team performance and satisfaction.

Remarkable are also divergences by team climate influences on team outputs: higher in satisfaction for hospitals and public administration, and higher in performance for software company. It is revealing too that for one of the teamwork contexts (software company) a proposal of model modification path between team climate latent variable of support for innovation and team performance improves the model fit for this group.

References

- Ancona, D., & Caldwell, D. F. (1992). Bridging the boundary: External activity and performance in organizational teams. *Administrative Science Quarterly*, 37, 634-665.
- Anderson, N. R., & West, M. A. (1994). *The Team Climate Inventory: Manual and User Guide*. Windsor, Berks.: ASE Press.
- Anderson, N. R., & West, M. A. (1998). Measuring climate for work group innovation: development and validation of the team climate inventory. *Journal of Organizational Behavior*, 19, 235-258.
- Bain, P. G., Mann, L., & Pirola-Merlo, A. (2001). The innovation imperative - The relationships between team climate, innovation, and performance in research and development teams. *Small Group Research*, 32, 55-73.
- Barrasa, A., West, M. A., & Gil, F. (submitted). Climate Quality and Climate Consensus for Work Group Innovation, Performance, and Satisfaction: A conclusive view through the Spanish Validation of the Team Climate Inventory (TCI).
- Bentler, P. M., & Bonnett, D. G. (1980). Significance tests and goodness-of-fit in covariance structures. *Psychological Bulletin*, 88, 588-606.
- Bollen, K. A. (1989). *Structural equation with latent variables*. Chichester : Wiley.
- Cheung, G. W., & Rensvold, R. B. (2002). Evaluating Goodness-of-Fit Indexes for Testing Measurement Invariance. *Structural Equation Modeling*, 9, 233-255.
- Curral, L. A., Forrester, R. H., Dawson, J. F., & West, M. A. (2001). It's what you do *and* the way that you do it: Team task, team size, and innovation-related group processes. *European Journal of Work and Organizational Psychology*, 10, 187-204.
- Dackert, I., Brenner, S. O., & Johansson, C. R. (2002). Team Climate Inventory with a merged organization. *Psychological Reports*, 91, 651-656.

- Denison, D. (1990). *Corporate culture and organizational effectiveness*. New York: John Wiley & Sons.
- Dunlap, W. P., Burke, M. J., & Smith-Crowe, K. (2003). Accurate Tests of Statistical Significance for r_{wg} and Average Deviation Interrater Agreement Indexes. *Journal of Applied Psychology*, 88, 356-362.
- Friedlander, F., & Margulies, N. (1969). Multiple impacts of organizational climate and individuals value systems upon job satisfaction. *Personnel Psychology*, 22, 171-183.
- Guzzo, R. A., & Shea, G. P. (1992). Group performance and intergroup relations in organizations. In M. D. Dunnette, & L. M. Hough (Eds.), *Handbook of Industrial and Organizational Psychology Vol. 3* (pp. 269-313). Palo Alto, CA: Consulting Psychologists Press.
- Hackman, R. J. (1990). *Groups that work (and those that don't). Creating conditions for effective teamwork*. San Francisco: Jossey-Bass.
- Hackman, R. J., & Morris, C. G. (1975). Group tasks, group interaction processes and group performance effects. *Advances in Experimental Social Psychology*, 8, 45-99.
- Hu, L., & Betler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6, 1-55.
- Ilgen, D., Hollenbeck, J. R., Johnson, M., & Jundt, D. (2005). Teams in Organizations: From Input-Process-Output Models to IMOI Models. *Annual Review of Psychology*, 56, 517-543.
- James, L. R., Dameree, R. G., & Wolf, G. (1993). r_{wg} : An Assessment of Within-Group Interrater Agreement. *Journal of Applied Psychology*, 78, 306-309.
- Jöreskog, K., Sörbom, D., Toit, S., & Toit, M. (2000). *LISREL 8: New Statistical Features*. Lincolnwood: Scientific Software International.

- Kenny, D.A., & LaVoie, L. (1985). Separating individual and group effects. *Journal of Personality and Social Psychology*, 48, 339-348.
- Lämsäsalmi, H., & Kivimäki, M. (1999). Factors associated with innovative climate: What is the role of stress? *Stress Medicine*, 15, 203-213.
- Mason, C. M., & Griffin, M. A. (2002). Group task satisfaction. Applying the Construct of Job Satisfaction to Groups. *Small Group Research*, 33, 271-312.
- Mason, C. M., & Griffin, M. A. (2005). Group task satisfaction - The group's shared attitude to its task and work environment. *Group & Organization Management*, 30, 625-652.
- Naumann, S. E., & Bennett, N. (2000). A case for procedural justice climate: development and test of a multilevel model. *Academy of Management Journal*, 43, 881-889.
- Payne, R. (1990). The effectiveness of research teams: a review. In M. A. West, & J. L. Farr (Eds.), *Innovation and Creativity at Work. Psychological and Organizational Strategies* (pp. 101-122). Chichester: Wiley.
- Peiró, J. M., González-Romá, V., & Ramos, J. (1992). The influence of work-team climate on role stress, tension, satisfaction, and leadership perceptions. *European Review of Applied Psychology*, 42, 49-56.
- Pritchard, R. D., & Karasek, B. W. (1973). The effects of organizational climate on managerial performance and job satisfaction. *Organizational Behavior and Human Performance*, 9, 126-146.
- Ragazzoni, P., Baiardi, P., Zotti, A. M., Anderson, N., & West, M. (2002). Italian validation of the team climate inventory: a measure of team climate for innovation. *Journal of Managerial Psychology*, 17, 325-336.
- Raykov, T. (1997). Simultaneous Study of Group and Individual Latent Longitudinal Change Patterns Using Structural Equation Modeling. *Structural Equation Modeling*, 4, 212-236.

- West, M. A., & Poulton, B. C. (1997). A failure of function: teamwork in primary health care. *Journal of Interprofessional Care, 11*, 205-216.
- Williams, G., & Laungani, P. (1999). Analysis of teamwork in an NHS Community Trust: an empirical study. *Journal of Interprofessional Care, 13*, 19-28.
- Yoon, M. H., Beatty, S. E., & Suh, J. (2001). The effect of work climate on critical employee and customer outcomes: An employee-level analysis. *International Journal of Service Industry Management, 12*, 500-521.

CONCLUSIONS

Leadership and Change-oriented Leadership, Group inputs as Team Size, Group processes as Group Potency and Team Climate influence on Innovation, Satisfaction, and Performance as Work Groups' Outcomes

The first step of analysis was to test the influence of leadership in the group process of teamwork. Results obtained from this research provide in a broad sense empirical support regarding factorial structure and regarding effectiveness. We found the specific behaviors measured by the questionnaire can be grouped into the three proposed metacategories in terms of their primary objective.

This hierarchical taxonomy offers a number of advantages. It provides a parsimonious and meaningful conceptual framework that shows how the behaviors are interrelated. It combines the parsimony of a few, broadly defined metacategories with the greater explanatory power of specific component behaviors that can be related to the requirements for a particular situation. It helps to integrate findings from prior research, and it can be used to derive more comprehensive theories of effective leadership.

There is a need of the leader's skill to analyze the situation, to anticipate change and providing the team with guidance we can consider as a key variable, relevant to include it into the behavioral leadership models.

The second step was to test the influence of some group input as team size on team outcomes (innovation, satisfaction, or team performance). In a broad sense, results from descriptive, linear and curvilinear regression analyses support the curvilinear hypotheses about the inverted *U*-shape nature of the relationship between team size, team processes and outcomes.

The relation between team size and team performance is not strong in any case (6% of variance for our data), but our understanding of the process improves with a curvilinear view: at some point around 12-15 members the increase in performance when increasing the team size is insignificant if not decreasing.

The relationship between team size and team innovation is revealing. In small groups the increase of size leads to increased innovation. Our data supports this postulate since there is no lineal but a curvilinear relation between team size and team innovation.

The relationships found between team size and team climate processes confirmed previous research and developed some new insights. Consistent with previous studies team climate processes of participation and support for innovation presented bivariate relationships in the linear regression and there is a linear relationship with team climate processes of participation and support for innovation, but these relations improve with curvilinear regressions. Team climate process of task orientation wasn't found in previous research, and in this study it presents a significant curvilinear relationship with team size. Finally, the team climate of objectives lacks any kind of relation with team size, which is consistent with previous research where objectives presented a different behavior than the rest of TCI processes in respect to team size.

Regarding the question on the 'optimal' group size; this research in health-care organizational setting suggests that as team sizes increases from some level (around 12-15 team members), there exists a decrease in team climate processes and team innovation, and an insignificant improvement in team performance. One also has to bear in mind variables like team

members' satisfaction, leadership, task type, cultural differences, organizational contexts, cohesion, or group potency.

In order to test the complete model of influence of change-oriented leadership and group processes as group potency and team climate on team outputs (satisfaction and performance) we found some empirical support regarding performance, and regarding satisfaction. This confirms the existence of a general mediation effect of global climate, and of the innovation climate, on the relationship between change-oriented leadership and both team outcomes, performance and satisfaction.

Empirical support is also provided regarding the moderating effect of potency on the relationship between change-oriented leadership and global climate and innovation climate. This relationship is maximized in high potency teams, but is hardly visible for low potency teams.

Finally, we have found uneven empirical evidence for the last hypotheses. Thus, we found empirical support regarding performance to the extent that the mediation effect is reinforced in high potency teams but vanishes in low potency teams. Contrary to our expectations, relatives to satisfaction, mediation is reinforced in low potency teams and vanishes in high potency teams.

In general, the results of present study offer considerable empirical support for the proposed model. The only unexpected result concerns the moderating effect of potency on the mediation of climate between leadership and satisfaction, which is contrary to the performance results. This may in part be because the two measures differ (aggregated subjective evaluations of satisfaction by the individual subjects in the first case, and external performance scorings by managers in the second). In any case, it is surprising that climate might mediate between the change-oriented leaders and satisfaction only in low potency

teams. This fact might be explained by considering that proposals for change made by the leader may have certain attractiveness in that they presuppose innovation and improvement. Thus, satisfaction would increase to the extent that such proposals are launched in a favorable climate, since satisfaction is strongly associated with a positive climate. This does not, however, work for high potency teams, possibly because their own self-confidence is a powerful, and perhaps sufficient, source of satisfaction, which may diminish the influence of other variables, including the proposals made by the change-oriented leader or the existence of a positive climate. This explanation would need to be tested in subsequent research.

We finally conclude with some implications for inter organizational context influences. The results indicate that although the team climate for innovation influence model on team satisfaction and performance has an invariant factor form and structure, as well as cross-contextual applicability, the mean values of the latent constructs differ between the three types of teamwork.

The proposed model has showed a moderate fit of the measurement model to the pooled data for all the different types of teamwork together. Demonstrating at team level the influence of team climate for innovation on satisfaction and performance in similar conditions as previously it have been illustrated at individual level. Differences in this model for diverse types of teamwork display higher levels of team climate for innovation in industrial sectors (software company) in comparison with health-care / public sectors, in the same direction as previous research.

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The present research is subject to certain limitations, which should be considered in future research. First, the sample; despite the relatively large number of individuals involved, the sample shrinks when the analysis is performed at the group level. It would also be of interest to use samples differentiated by service within the healthcare field, and from other sectors. It would also be interesting to fill out this correlative and cross-level study by carrying out experimental and longitudinal research to establish the direction of causality and explore the possible influence of team development over time.

The findings also invite to explore the conditions under which change-oriented leadership, insofar as it represents a strategic issue, will have the greatest impact, analyzing the environment, external relations and so on, as well as the moderating role of leadership between these variables and climate. Similarly, the relationships between other important variables need further examination, as task and objectives interdependence, empowerment and team autonomy, etc. It would likewise be of interest to study their effects on new forms of work organization and on virtual teams.

To conclude, the importance of the leader's role in anticipating change and providing the team with guidance in fluid situations is beyond doubt, but his/her real influence will depend on having the appropriate allies, on a favorable team climate and on the existence of teams that are confident of their own potential.

